Shared Data Reference

IND570

Weighing Terminal

METTLER TOLEDO

IND570 Weighing Terminal

METTLER TOLEDO Service

Essential Services for Dependable Performance of Your IND570 Weighing Terminal

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use of your new equipment according to this Manual and regular calibration and maintenance by our factory-trained service team ensures dependable and accurate operation, protecting your investment. Contact us about a service agreement tailored to your needs and budget. Further information is available at www.mt.com/service.

There are several important ways to ensure you maximize the performance of your investment:

1. **Register your product**: We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.
2. **Contact METTLER TOLEDO for service**: The value of a measurement is proportional to its accuracy – an out of specification scale can diminish quality, reduce profits and increase liability. Timely service from METTLER TOLEDO will ensure accuracy and optimize uptime and equipment life.
    a. **Installation, Configuration, Integration and Training**: Our service representatives are factory-trained, weighing equipment experts. We make certain that your weighing equipment is ready for production in a cost effective and timely fashion and that personnel are trained for success.
    b. **Initial Calibration Documentation**: The installation environment and application requirements are unique for every industrial scale so performance must be tested and certified. Our calibration services and certificates document accuracy to ensure production quality and provide a quality system record of performance.
    c. **Periodic Calibration Maintenance**: A Calibration Service Agreement provides on-going confidence in your weighing process and documentation of compliance with requirements. We offer a variety of service plans that are scheduled to meet your needs and designed to fit your budget.
3. **GWP®**: A risk-based approach for managing weighing equipment allows for control and improvement of the entire measuring process, which ensures reproducible product quality and minimizes process costs. GWP, the science-based standard for efficient **life-cycle management of weighing equipment**, gives clear answers about how to specify, calibrate and ensure accuracy of weighing equipment, independent of make or brand. GWP covers every relevant step in the equipment's life cycle.

COPYRIGHT

METTLER TOLEDO RESERVES THE RIGHT TO MAKE REFINEMENTS OR CHANGES WITHOUT NOTICE.

FCC Notice

This device complies with Part 15 of the FCC Rules and the Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her expense.

- Declaration of Conformity is located on the documentation CD.

RoHS Compliance Statement.

- The majority of our products fall within categories 8 and 9. Those categories currently do not fall within the scope of the Directive 2002/95/EG (RoHS) of January 27, 2003. If our products are intended for use in other products which themselves fall within the scope of the RoHS Directive, compliance requirements have to be separately negotiated contractually.
- Those products which fall within categories 1-7 and 10 will be in compliance with the EU RoHS Directive from no later than July 1, 2006.
- If it is not possible for technical reasons to replace any non-RoHS-compliant substances in any of the above products as required, we plan to inform our customers in a timely manner

Statement regarding harmful substances

We do not make direct use of harmful materials such as asbestos, radioactive substances or arsenic compounds. However, we purchase components from third party suppliers, which may contain some of these substances in very small quantities.

Contents

Contents

Contents

Contents

1 Introduction and Overview

The Shared Data (SD) Server is the central repository for all "system" data in the IND570. It is also the primary interface for sending commands and exchanging data between local or remote Applications and the Resident Scale Task (RST) in the IND570. The RST is the portion of the terminal firmware that specifically controls weighing functions.

The term "Application" is frequently used to indicate the use of Task Expert custom programming, but also refers to non-TE custom programming that accesses and manipulates Shared Data fields to carry out specific functions and processes.

1.1. IND570 Shared Data Design

The Shared Data concept has been a very powerful and flexible tool. It provides mechanisms for both storing system data and for providing interfaces among Local Applications, Remote Applications, and the Resident Scale Task.

1.1.1. Shared Data Design Concepts

The following are some important Shared Data design concepts incorporated into the IND570 Shared Data:

- Shared Data provides Local and Remote Applications and the Resident Scale Task very fast access to the permanently stored data. Shared Data access time is less than 350 microseconds.
- Provides a consistent naming convention among all Shared Data fields. Local and Remote Applications access a Shared Data field using a six-character UNICODE name. Names provide consistency to Applications in accessing Shared Data fields in successive versions of Shared Data. The names for existing fields will remain the same even when new fields are added or when new physical storage locations are assigned to existing data. Shared Data uses a binary search of the names in the Data Dictionary to find a field definition quickly
- Shared Data is organized into "object-oriented" blocks that make it is easier for Application programmers and users to understand how to use Shared Data.
- Shared Data uses a Shared Data Dictionary that is an alphabetically sorted list of all the fields in Shared Data. The Shared Data Dictionary provides the name, storage type, data type, attributes, location, and length of each field. Shared Data uses the dictionary to find and process Shared Data requests.
- Data types are standardized and limited to a small, defined, consistent group.
- Provides data access control on an individual field basis, rather than on a block basis as in previous products like the JagXtreme. IND570 has four levels of access security: Operator, Supervisor, Service, and Administrator.

- Data Storage Types and data fields are organized to make best use of the memory available on the IND570. In particular, the terminal uses Flash memory to store protected setup fields that change infrequently. Protected process fields that change frequently are stored in Battery-backed RAM (BRAM); dynamic fields in Dynamic RAM; and scale calibration data in EEPROM on the scale boards.
- Shared Data supports "callbacks" that alert a task when a Shared Data field changes. An Application or Resident Scale Task can "Register a Callback Routine" for a particular Shared Data field. Then, when a task writes a new value to a Shared Data field that has a registered callback, Shared Data calls the registered callback routine.
- Shared Data supports both "native" and "string representation" access to data fields. However, Shared Data always stores the data fields in their native format. When an Application accesses a Shared Data field in its native data format, such as binary floating point or integer number representations, Shared Data simply copies the data between its storage and the Application interface. When Applications access the Shared Data using a string data format, Shared Data makes the data conversion between the native and the string data format.
- Shared Data provides access to an entire Shared Data block with a single read or write command. Applications can access the block of data in either native format or string format. When an Application accesses the data in native format, Shared Data returns a "C-style structure" that matches the native format of the data. When an Application accesses the data in string format, Shared Data converts each individual field to its string format, separating fields with a caret ('^').
- Shared Data provides a checksum on each protected Shared Data field. It verifies the checksum on power-up and on each read access. It recalculates and stores the new checksum on each write access. When Shared Data detects a checksum failure, it reports a system failure.
- A Change Log file is available that records every change to the Protected Setup Shared Data fields. This forms a service record that the customer or service technician can review to find or validate changes to the IND570 setup. Recording all process changes is becoming an important requirement for U.S. pharmaceutical applications.
- Validates changes to Protected Setup and Calibration EEPROM fields. It compares the new value with the range of legal values in the Shared Data Dictionary. If Shared Data finds the new value is not legal, it does not update the field and returns an error status to the Application.
- Permits an FTP connection to save Shared Data to and restore it from a PC.

1.2. Shared Data Name Structure

Each Shared Data field has a six-character alphanumeric "name" that the Application uses to access the Shared Data field. The name contains the class, instance, and attribute of the Shared Data variable, each of which is two characters long. For example, Shared Data variable "sp0106" is the latched/unlatched target setting of the single (instance) scale the IND570 will support at one time. The name is constructed as follows:

sp	=	Class	=	Full Target Process Data
				(Note: Class can be written as all uppercase or all lower case)
01	=	Instance	=	Scale #1

06 = Attribute = Target Latch Type

1.3. Shared Data Storage Types

There are four types of IND570 Shared Data:

D	Dynamic (Dynamic RAM) Shared Data
PP	Protected Process (BRAM) Shared Data
PS	Protected Setup (FLASH) Shared Data
PC	Protected Scale Calibration (EEPROM) Shared Data

These letters are used in this document to identify the data type of each block.

1.3.1. Dynamic Shared Data

Dynamic Shared Data is process data that the Resident Scale Task or Applications dynamically create within the IND570. The IND570 writes Dynamic Shared Data to Dynamic RAM memory, and it writes and reads these fields very frequently. The IND570 does not save this Shared Data across a power-failure, but re-initializes it to zero at power-up. The best example of Dynamic Shared Data is the Dynamic Scale Weight data (WT).

1.3.2. Protected Process Shared Data

Protected Process Shared Data is persistent data that may be written and read many times. The Resident Scale Task and Applications use this Shared Data to maintain the state of an active process. However, in case of a power-failure the IND570 must save the data so the process can continue after power-up. The IND570 writes this Shared Data to battery-backed RAM (BRAM) to save it across a power failure.

An example of Protected Process Shared Data is the state of a Material Transfer process, where you cannot afford to throw out an incomplete batch of material after a power-failure. The IND570 must save its state so the Material Transfer can continue after a power-up.

1.3.2.1. Writing BRAM Shared Data During Power-Down

A critical event occurs when the IND570 attempts to write to BRAM Shared Data just as the power goes down. The IND570 writes part of a Shared Data field successfully, and then power drops below a valid-power threshold before the IND570 can complete the write, causing a corrupted BRAM. Since writes to BRAM can occur frequently in a process control environment, it is probable that this will happen at some point when the IND570 is running.

To protect against this potential problem, the IND570 does a two-stage write procedure whenever it writes to BRAM:

- The IND570 first writes a write-in-progress flag, the new Shared Data field, its SD field index, and its checksum to a temporary location in BRAM. When this write is successfully completed, the IND570 then writes the SD field and its checksum to its actual location in BRAM. When this write is successfully completed, the IND570 clears the write-in-progress flag.
- At power-up, the IND570 checks the write-in-progress flag. If it is set, the IND570 writes the original SD field from the temporary field and clears the write-in-progress field.

1.3.3. Protected Setup Shared Data

Protected Setup Shared Data is the persistent data that stores the unique configuration of the IND570. The IND570 Setup Procedure typically writes this data once during the Setup procedure and then never writes it again. Other processes may read it many times. The IND570 writes this Shared Data to Flash Memory to save it permanently across a power-failure.

1.3.3.1. Writing Flash Shared Data During Power-Down

A critical window occurs when the IND570 attempts to write to Flash Shared Data just as the power goes down, causing corrupted Flash Shared Data. The IND570 writes part of a Shared Data field successfully, and then power drops below a valid-power threshold before the IND570 can complete the write.

To reduce the likelihood of this corruption, the IND570 only writes to the Flash during Setup. **The IND570 never writes to Flash Shared Data during normal operation.** The period the IND570 spends in Setup is extremely small compared to the time it spends in normal operation. Typically, the service technician sets up the IND570 once and never accesses Setup again.

To protect against the potential corruption problem, the IND570 does a multi-stage write procedure whenever it writes to FLASH:

- When the IND570 first writes the new Shared Data field data, it writes the SD field index and sets a write-in-progress flag to temporary locations in BRAM.
- After successfully completing this write, the IND570 then writes the SD field to its actual location in FLASH, in the FLASH.bin file.
- It records the change in the change history log file.
- After successfully completing the write to flash, the IND570 clears the write-in-progress flag. Upon exiting setup, the IND570 creates a backup copy of the FLASH.bin file.
- At power-up, the IND570 reads the FLASH.bin file into memory. If this fails, the IND570 checks for the presence of a FLASH backup file. If it exists, it copies the flash backup and restores any additional entries from the change history log file. The IND570 then checks the write-in-progress flag. If it is set, the IND570 writes the original SD field from the temporary field and clears the write-in-progress flag.

1.3.4. Protected Scale Calibration Shared Data

Protected Scale Calibration Data is the persistent scale calibration data. The IND570 writes this Shared Data to the EEPROM on the Scale boards to protect it across a power-failure. On power-up, it reads an image of the EEPROM into the Protected Process BRAM Shared Data, where the Resident Scale Task and Applications can read it. **The IND570 only writes the EEPROM after a successful scale calibration.**

1.3.4.1. Writing EEPROM Shared Data During Power-Down

A critical event occurs when the IND570 attempts to write to EEPROM Shared Data just as the power goes down. The IND570 writes part of the EEPROM successfully, and then power drops below a valid-power threshold before the IND570 can complete the write, causing a corrupted EEPROM.

To protect against this problem, the IND570 does a two-stage write procedure whenever it writes to EEPROM:

- The IND570 first writes a write-in-progress flag and the new EEPROM data into a temporary location in BRAM. When this write is successfully completed, the IND570 then writes the data and its checksum to the EEPROM. When this second write is successfully completed, the IND570 clears the write-in-progress flag.
- At power-up, the IND570 checks the write-in-progress flag. If it is set, the IND570 writes the EEPROM from the temporary field and clears the write-in-progress field.

1.4. Command Triggers

The Resident Scale Task uses Shared Data callbacks for triggering its internal commands. Then, the RST uses other Shared Data status fields for reporting the activity and the results of its commands. Typically, command triggers reside in Dynamic Shared Data. Applications can also use Shared Data callbacks for triggering commands. There are many fields in Shared Data that enable applications to define command triggers.

Callbacks are a powerful mechanism for sending commands to the Resident Scale Task or to Applications through writes to Shared Data. The destination task must first register a callback to Shared Data on its designated command field. Then, local or remote processes may initiate a write to the field to trigger a callback to the destination task. The IND570 designates the special Shared Data fields that can use callbacks as "real-time" fields. **In this document, "rt" designates real-time fields, while "na" designates non-real-time fields that do NOT support callbacks.**

Edge-Sensitive commands are also real-time fields, but the IND570 only makes a callback to process these commands when the field transitions from zero to a non-zero value. **In this document, "rc" designates edge-sensitive command fields.**

1.5. Application Commands to the Resident Scale Task

Applications can issue commands to the Resident Scale Task using the Shared Data Command Triggers. The Application sets the Command Trigger to 1 to issue the command. This generates a callback to the Resident Scale Task. The Resident Scale Task detects that the Command Trigger is set and processes the command. When it is done processing the command, the Resident Scale Task sets the Command Trigger back to 0.

A Shared Data Command Status is associated with each Command Trigger. The Application can read the Command Status to determine the completion status of the command. 0 indicates that the command was successful, and 1 indicates the command is in progress. A status greater than 1 is a specific failure code. The Application can monitor the Command Trigger or Command Status to know when the command is complete.

For example, to issue a Tare Command to the scale, the Application sets Shared Data field wc0101 to 1. Then, the Application monitors for the Shared Data field wx0101 to be set to 1, which indicates the command is in progress. Then, it monitors for wx0101 to change again to get the completion status of the command. The Resident Scale Task then sets wc0101 to 0 when it completes the command.

1.6. Data Format Types

IND570 Shared Data supports the following data types:

Mnemonic	Data Type	Description
BI	I1	Boolean fields are one-byte integers, but can only take a value of 0 or 1.
By	I1	One byte integer
US	UI2	Two byte unsigned integer
UL	UI4	Four byte unsigned integer
F	R4	Single precision floating point
D	R8	Double precision floating point
ABy nn[1] ABI nn[1]	Array I1 Array I1	Array of I1 Array of I1 Boolean
S mm[2]	Array UI2	A Unicode String. NULL terminated. Array of UI2.
AL nn[1]	Array UI4	Array of UI4
Struct	Struct	Composite structure of entire block

1. "nn" represents the length of the array
2. "mm" represents the max length of the Unicode String, including the null terminator.

1.7. Change History Log

The IND570 maintains a history of all changes to the Setup and Calibration Shared Data in a resident Flash Memory file. There is a separate record for each changed field. The record contains the field name, date and time, user ID, and the new contents of the field. It also maintains a history log of all Shared Data backups and restores.

1.7.1. Functions of the Change History File

- It provides traceability of changes to Setup and Calibration data. It allows the customer or service technician to find and view the changes to Shared Data. They can validate that the system has been setup properly and that Shared Data contains only the authorized settings.
- It satisfies the FDA CFR 21 Part 11 regulations for the U.S. food and pharmaceutical industries for maintaining strict control over the safety of their processes and for documenting any changes to their processes.
- In case of a catastrophic system failure, you can use an archived Change History file to reconstruct Shared Data. To recover the system, you must first reset the system to the factory defaults and then use a utility to apply the changes from the Change History file one at a time.

The Unicode format of each history record is:

"SSSSSS DDDDDD TTTTTT AUTHOR L VALUE"

Where:

- SSSSSS is the six-letter Shared Data Name;
- DDDDDD is the date of change from xd0103;
- TTTTTT is the time of change from xd0104;
- AUTHOR is the name of the user who made the change from xd0125, xd0127, or xd0129;
- L is the security-level of the user who made the change from xd0126, xd0128, or xd0130;
- VALUE is a Unicode representation of the new value written to the Shared Data variable.

The Change History is a maximum of 250,000 bytes long.

When the file is 75% full, the IND570 SD issues a warning to the user that the file is becoming full. Then, the user can offload it to a PC using FTP and reset the resident log file.

When the file becomes 90% full, the IND570 SD issues an urgent warning to the user. Again, the user can offload the log file to a PC and reset the resident log file.

When the file becomes 100% full, the IND570 SD issues an "error alert" to the operator and halts any further updates to Setup until the user takes the appropriate action to save and reset the resident log file.

1.8. Shared Data Access Control

IND570 Shared Data provides data access control for individual fields, rather than on a block basis like previous product such as the JagXtreme. The Shared Data Dictionary holds the "access privileges". The "access privilege" attributes for each Shared Data field determines how local and remote applications can access the fields. Generally, anyone can read any Shared Data element. The notable exceptions are password fields, which only the IND570 System modules may read. Hard-coding in Shared Data restricts read-access to the password fields. The Shared Data Dictionary defines the write-access privileges on an individual field basis, according to the class of the user.

There are four classes of user – Administrator, Service, Supervisor, and Operator. The Administrator class always has the maximum possible write-access capability. However, not even an Administrator can write into "Read Only" fields. Typical Read Only fields are Real Time Data fields that contain the weight data for the scale.

There is no enforced class hierarchy below Administrator. Other classes have write-access to fewer Shared Data fields. By convention, the Operator class has the fewest rights, and the Supervisor class is a superset of the Operator class. Service rights could be as great as the Administrator level or complementary to the Supervisor rights, according to the customer site needs. Shared Data fields have factory-default access rights that meet most Application needs. In the default definition, each higher class has also write-access privileges to all data assigned to lower classes.

To satisfy legal metrology regulations or customers' security concerns, it is often necessary to limit terminal write-access after the customer has installed the terminal. For example, no user of any class may change setup parameters after a government inspector has certified and sealed the terminal.

The IND570 has a Security Switch on its main PCB. The service technician can mechanically seal the IND570 to prevent tampering with the Security Switch. When in the UNSECURED position, authorized users may write to Shared Data fields according to the "access privilege" bits in the Shared Data Dictionary. In the SECURED position, NO users have write-access to Shared Data fields that previously had Administrator-only write privileges.

1.9. Validating Setup Data

IND570 Shared Data validates changes to Protected Setup and Calibration EEPROM fields. It compares the new value with the range of legal values stored in the Shared Data Dictionary. If Shared Data finds the new value is not legal, it does not update the field and returns an error status to the Application.

Shared Data does not validate all fields. It only validates those that it can validate using a table of values. It does not validate those fields that require special programming logic to validate.

Shared Data supports an Application command that returns the validation criteria for a particular field to the Application so the Application can display the list of legal values.

The Shared Data Dictionary has different validation criteria based on the type of validation required. Some of the validation types include:

- **Boolean validation**. Only zero (0) or one (1) is a legal value.
- **Range validation**. Only values within a range are valid. The Data Dictionary contains the minimum and maximum legal values. For example, integer values from one to five are valid, or floating-point values from 0.0 to 9.9 are valid.
- **List validation**. Only values in a list of values are valid.
- **No validation.**

1.10. Shared Data Server Commands

After connecting to the Shared Data Server in the IND570, several commands are available for use. All commands can be given in either upper- or lower-case letters. The quotation marks shown are for clarity only and should not be transmitted. Valid commands are described in the following sections.

- **Response Format**: "read", "write", and "callback" message responses have a formatted header. The first two characters indicate the status. "00" is the success status. "99" is a failure status. The next character is the type of message, "r", "w", or "c". The next three characters are a sequence number, which cycles from 001 to 999, and then starts over again.

1.10.1.1. "user" Command

A client must login to the SDSV using the "user" command before accessing Shared Data. The server validates the username and sends a response message back to the user. The SDSV responds with [Access OK] if no password is required or [Enter password] if a password is required.

A client can use only the "user", "pass", "help" and "quit" commands before successfully logging on.

Format: user username

Response 1: 12 Access OK

Response 2: 51 Enter Password

1.10.1.2. "pass" Command

The user enters a password using the "pass" command. If the password is valid, the server displays the [Access OK] message. If not valid, the server displays the [No access] message.

Format: pass password

Response: 12 Access OK

1.10.1.3. "help" Command

The "help" command returns the list of the valid commands for the IND570.

Format: help

Response: 02 USER PASS QUIT READ R WRITE W SYSTEM CALLBACK XCALLBACK GROUP RGROUP XGROUP CTIMER LOAD SAVE HELP NOOP CONTOUT XCOUNTOUT PRINTOUT XPRINTOUT

1.10.1.4. "quit" Command

The "quit" command terminates the TCP/IP connection.

Format: quit

Response: 52 Closing connection

1.10.1.5. "read" Command

The "read" command allows the client to read a list of one or more Shared Data fields. An individual field or an entire block can be read. If more than one field is requested, the fields should be separated by a space. If successful, the server responds with a separated list of values in ASCII format. The server separates individually requested fields with a "~"; and Shared Data separates items within a block with a "^". If an error is detected, the server responds with an error message. The maximum length of the reply message is 1,024 characters.

Format: read SDV#1 SDV#2

Example 1: read wt0101 wt0103

Response 1: 00R003~ 17.08~lb~

Example 2: read sp0100 (reads entire block)

Response 2: 00R012~XP/0163M^1^^78^20.500000^0^0^0^1.200000^3.500000^0.150000^0.050000^0^0.000000^0.000000^0^0^0^0^0^0^1^0.000000^0.000000^0.000000^0.000000^0.000000^~

- The "read" command can be abbreviated to the letter "r" if desired.

1.10.1.6. "write" Command

The "write" command allows the client to write a list of one or more Shared Data fields. A single field or an entire block can be written. The maximum length of the write message is 1,024 characters. Items within a list of writes must be separated with a "~". You must separate items within a block with a "^".

Format: write SDVblock#1=value1^value2^ value3 write SDV#1=value1~SDV#2=value2~SDV#3=value3

Example1: write ak0100=abc^def^hij^lmn (writes fields into a block)

Response 2: 00W006~OK

Example 2: write aj0101=12.56~aj0150=987.653 (writes fields within a list)

Response 2: 00W007~OK

- The "write" command can be abbreviated to the letter "w" if desired.

1.10.1.7. "system" Command

The "system" command returns a description of the IND570 terminal. This is the same information that is shown on the Recall System Information screen of the IND570.

Format: system

Response: 0S005~ SYSTEM INFO RECALL

Model: IND570
S/N:
ID1: IND570
ID2: METTLER_TOLEDO
ID3:
Software
Boot: L2.00 181348
Standard: L3.00 181349
Hardware
Analog L/C
Opt: E-Net

1.10.1.8. "noop" Command

The "noop" command performs no task; it checks communication and returns an [OK] response message.

Format: noop

Response: 00OK

1.10.1.9. "callback" Command

The "callback" command allows the client to define one or more fields for which the Shared Data Server sends a message to the client when the value of the callback field changes. Only certain SDV may be included in a callback command. These SDV are noted by an "rc" or "rt" status in the column after the structure column in the Shared Data document. Mainly, these are triggers that are used in the terminal. SDV with a status of "na" are not real-time SDV and cannot be used in callbacks.

The callback message contains one or more changed field names and the new value for each field. A maximum of twelve callback fields can be specified. The "ctimer" command specifies the minimum time between repeated callback messages.

Format: callback SDV#1 SDV#2

Example: callback st0102 st0103 st0104

Response 1: 00B001~OK

Response 2: 00C005~st0102=0^st0103=1^st0104=1 (sent when all of the SDV change)

Response 3: 00C006~st0104=0 (sent when only st0104 changes)

1.10.1.10. "xcallback" Command

The "xcallback" command allows the client to remove one or more callback fields from the list of current SDV.

Format: xcallback SDV#1 SDV#2 or xcallback all (removes all callbacks)

Example: xcallback st0102 (removes st0102 SDV from callback)

Response: 00X008~OK

1.10.1.11. "group" Command

The "group" command allows the client to define a group of callback fields. The Shared Data Server sends a message to the client when the value of any field in the group changes. The group callback message contains the group number and the values of all fields in the group in the defined order. The "ctimer" command specifies the minimum time between repeated callback messages. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: group n SDV#1 SDV#2 SDV#3 (where n = the number of the group 1–6)

Example: group 5 st0103 st0104 st0107 (groups target feeding and tolerance SDV into one group)

Response 1: 00B019~OK

Response 2: 00C026~group5=0^1^0 (indicates status of all 3 SDV in group 5 whenever any one of them changes)

1.10.1.12. "rgroup" Command

The "rgroup" command allows the client to define a group of fields. The client can use the group number to read the entire group at once using the READ command. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: rgroup n SDV#1 SDV#2 (where n = the number of the group 1–6)

Example: rgroup 3 di0101 di0102 di0103 di0104 (groups all discrete inputs into one group that can be read with a single read command)

Response: 0G008~group=3, number fields=4

Read Example: r 3

Response: 00R009~1~0~1~0~

1.10.1.13. "xgroup" Command

The "xgroup" command allows the client to remove one or all groups.

Format: xgroup n (where n = the group number 1 - 6) or XGROUP all (removes all groups, including "contout" and "printout")

Example: xgroup 5 (cancels group 5)

Response: 00X011~group=5

1.10.1.14. "contout" Command

The "contout" command allows the client to define the continuous output string as a callback field. The Console Print Server sends a message to the client at each continuous output. The continuous output message is either in the Standard METTLER TOLEDO Continuous Output format or in a continuous template format. The "ctimer" command specifies the minimum time between repeated callback messages. The "xcontout" command removes the registration from the terminal and the communication will stop.

Format: contout

Response: 00G008~number CONTOUT streams=1

When a continuous output occurs to the Ethernet port, the data will be sent to the client formatted as selected in setup.

Data: 00C004 4! 354 236
00C005 4! 354 236

1.10.1.15. "xcontout" Command

The "xcontout" command allows the client to remove the continuous output callback, thus ending the registration so no further continuous outputs will be available.

Format: xcontout

Response: 00X070~CONTOUT

1.10.1.16. "printout 1" Command

The "printout" command allows the client to define a Demand Print Stream as a callback field. The Demand Print Streams include demand print (triggered by the scale) and custom triggers (triggers 1, 2, and 3). The console print server sends a message to the client at each print output. Since print messages can span multiple message blocks (depending upon size), the start of the print message has a <dprint> tag and the end of the message has a </dprint > tag. To register all Print Streams, simply use the command "printout". To register a single or select multiple printouts, use command "printout 1" or "printout 1 3" (for example). After registering for the demand output, the client will receive the appropriate data stream. The "ctimer" command specifies the minimum time between repeated callback messages. The "xprintout" command removes the registration from the terminal and the communication will stop.

Format: printout 1

Response: 00G008~number PRINTOUT streams=1

When a demand output occurs to the Ethernet port, the data will be sent to the client formatted by the selected template. There will be <dprint> and </dprint> delimiters for the string.

Data: 00P004 <dprint> 22.08 lb
17.06 lb T

5.02 lb N
</dprint>

1.10.1.17. "xprintout" Command

The "xprintout" command allows the client to remove the print output callback, thus ending the registration so no further demand outputs will be available.

Format: xprintout

Response: 00X070~PRINTOUT

1.10.1.18. "ctimer" Command

The "ctimer" command allows the client to set the minimum time between repeated callback messages in milliseconds. The minimum allowable setting is 50 milliseconds and the maximum is 60 seconds. The default value is 500 milliseconds.

Format: ctimer n (where n is the number of milliseconds)

Example: ctimer 1000 (set the callback timing to 1 second)

Response: 00T862~new timeout=1000

1.10.1.19. "csave" Command

The "csave" command saves the current callback and group settings into Shared Data for use later with the "cload" command.

Format: csave

Response: 00L004~OK

1.10.1.20. "cload" Command

The "cload" command loads the callback and group settings from Shared Data into the shared data server. The terminal will begin to service the loaded callback and group commands.

Format: cload

2 Scale Data

2.1. Scale Functionality

2.1.1. Dynamic Scale Weight (WT)

Access:	"Read Only" Access.		
Class Code:	0x68	Data Type:	D
Instances:	1	Instance 1 = Scale platforms 1	

2.1.1.1. Attributes

wt0100	Composite wt block	Struct	Na	Composite of entire block
wt0101	Displayed Gross Weight	S13	rt	Rounded Gross Weight shown in selected increment size.
wt0102	Displayed Net Weight	S13	rt	Rounded Net Weight shown in selected increment size.
wt0103	Weight Units	S4	rt	**lb** pounds, **kg** kilograms, **g**rams, **oz** ounces, **oz**troy, **dwt** pennyweights, metric **t**ons, **ton**, or custom units name
wt0104	3rd Weight Unit Gross Weight	S13	rt	Shows the current displayed gross weight converted to 3rd units
wt0105	3rd Weight Unit Net Weight	S13	rt	Shows the current displayed net weight converted to 3rd units
wt0106	Third Weight Unit	S7	rt	**lb** pounds, **kg** kilograms, **g**rams, **oz** ounces, **lb-oz** pounds & ounces, **oz**troy, ounces, **dwt** pennyweights, metric **t**ons, **ton**, or custom units name
wt0108	Displayed Rate	S13	rt	
wt0110	Rounded Gross Weight	D	rt	Gross weight rounded to selected increment size, but displayed in SD at smallest division value possible.
wt0111	Rounded Net Weight	D	rt	Net weight rounded to selected increment size, but displayed in SD at smallest division value possible.
wt0112	Rounded 3rd Weight Unit Gross Weight	D	rt	Shows the current displayed gross weight converted to 3rd units and rounded to selected increment size, but displayed in SD at smallest division value possible
wt0113	Rounded 3rd Weight Unit Net Weight	D	rt	Shows the current displayed net weight converted to 3rd units and rounded to selected increment size, but displayed in SD at smallest division value possible
wt0114	Fine Rate	D	rt	Rate displayed to the smallest division value possible.
wt0115	Scale Processing State	By	rt	0 = Disabled. 1 = Normal Weight Processing. 5 = Error.

wt0116	Continuous Output Status Word A	By	rt	Status of bit A of Standard Mettler-Toledo Continuous
wt0117	Fine Gross Weight	D	rt	Gross weight displayed to the smallest division value possible.
wt0118	Fine Net Weight	D	rt	Net weight displayed to the smallest division value possible.
wt0119	Weight Range	By	rt	0, 1, 2, or 3
wt0120	Filtered Weight Counts	D	rt	
wt0133	IDNet Restart Zero String	S25	na	Message specific to IDNet base.
wt0134	IDNet Scale Update Rate	S25	na	″F MF″Message specific to IDNet base. The general format of the message from the IDNet base is as follows: F M L x i [i i ...] CR LF x = actually adjusted value i = adjustable values
wt0135	IDNet Scale Vibration Adapter	S25	na	″F MI″ Message specific to IDNet base.
wt0136	IDNet Weighing Process Adapter	S25	na	″F ML″Message specific to IDNet base.
wt0137	IDNet Automatic Stability Detection	S25	na	″F MS″ Message specific to IDNet base
wt0138	IDNet Auto-Zero Setting	S25	na	″F MZ″ Message specific to IDNet base
wt0139	IDNet Software Part Number	S12	na	″P″ Message xxxx-x-xxxx string from IDNet base
wt0140	IDNet Calibration Identification Code	S3		″I″ Message 00 to 99 calibration count from IDNet

2.1.1.2. Method

The Resident Scale Task updates the dynamic weight Shared Data at every weight update, whenever the weight changes. The RST converts the weight from the raw filtered counts to the Legal-For-Trade weight.

2.1.2. Scale Process Data (WS)

Access:	″Read Only″ Access.		
Class Code:	0x66	Data Type:	PP
Instances:	1		

2.1.2.1. Attributes

ws0100	Composite ws block	Struct	na	Composite of entire block
ws0101	Current Scale Mode	By	rt	G = Gross = 71 (ASCII Character) N = Net = 78 (ASCII Character)
ws0102	Rounded Tare Weight	D	rt	Tare weight rounded to selected increment size, but displayed in SD at smallest division value possible.
ws0103	Fine Tare Weight	D	rt	Tare weight displayed in SD at smallest division value possible.

ws0104	Rounded 3rd Unit Tare Weight	D	rt	3rd unit tare weight rounded to selected increment size, but displayed at smallest division value possible.
ws0105	Current Units	By	rt	1 = Primary, 2 = Secondary, 3 = Third
ws0106	Tare Source	By	rt	1 = Pushbutton. 2 = Keyboard. 3 = Auto tare.
ws0107	Current Zero Counts	D	na	Power up zeroing, Pushbutton zeroing, & Auto-zero maintenance can modify the current zero. The "reset to factory" value is -999999.0, which tells the RST to initially set the current zero to the calibrated zero.
ws0108	Stored Weight	D	na	Initial weight for Net-Sign Correction
ws0109	Tare Source String	S2	na	PT = keyboard tare, otherwise "T "
ws0110	Displayed Tare Weight	S13	na	Rounded Tare Weight shown in selected increment size.
ws0111	Displayed 3rd Unit Tare Weight	S13	na	Rounded 3rd unit tare weight shown in selected increment size.
ws0112	Last Demand Print Message	S1001	na	Last Demand Print Message for Scale
ws0113	Gross Weight at Last Print	D	na	The Resident Scale Task uses this to record the last printed weight and power-up weight, for use in the comparison logic for the weight-deviation print interlock.
ws0114	Current Scale Mode	S13	na	G = Gross. N = Net
ws0127	Total of Active Tare Record	D	na	Accumulated total of active or currently recalled Tare Table record.
ws0128	"n" of Active Tare Table Record	UL	na	n = number of transactions accumulated in active or currently recalled Tare Table record.
ws0129	Description of Active Tare Table Record	S21	na	Description of active or currently recalled Tare Table record.
ws0130	Total of Current Target ID record	D	na	
ws0131	Number of Current Target ID Record	UL	na	

2.1.2.2. Method

The Resident Scale Task maintains its scale process data in this block. This scale process data may change frequently, but must be stored permanently. The Scale Tare Setup section describes how the RST uses the tare process data in this block.

2.1.3. Scale Commands (WC)

Access:	"Operator" Level Access.		
Class Code:	0x76	Data Type:	D
Instances:	1		

2.1.3.1. Attributes

wc0100	Composite wc block	Struct	na	Composite of entire block
wc0101	Pushbutton Tare Scale	Bl	rc	Application sets from 0 to 1 to trigger command
wc0102	Clear Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0103	Print Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0104	Zero Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0105	Switch to Primary Units	Bl	rc	Set from 0 to 1 to trigger command
wc0106	Switch to Secondary Units	Bl	rc	Set from 0 to 1 to trigger command
wc0107	Toggle Primary/Secondary units/3rd units	Bl	rc	Set from 0 to 1 to toggle units
wc0112	Restart Filtering	Bl	rc	Set from 0 to 1 to trigger command
wc0117	Toggle High-precision Weight	Bl	rc	Set from 0 to 1 to toggle On / Off. Toggle high precision weight display & calculation setting to on/off. In legal-for-trade mode, high-precision weight display automatically switches back to normal display mode after 5 seconds
wc0118	Switch to 3rd units	Bl	rc	Set from 0 to 1 to trigger command
wc0124	Print Total Report	Bl	rc	Set from 0 to 1 to trigger command

2.1.3.2. Methods

For example, to issue a Tare Command to the scale, the Application sets Shared Data field wc0101 = 1.

After receiving the callback, the Resident Scale Task sets wx0101 = 1 to indicate the command is in progress. When the command is complete, the Resident Scale Task sets wx0101 = 0 to indicate the command is successful or wx0101 = 2 to 255 as an error code. It sets wc0101 = 0 so the Application can trigger the command again later. The Application can register a callback on wx0101 to monitor when the command is complete and to get the completion status of the command.

2.1.4. Scale Statuses (WX)

Access:	"Read Only" Access.		
Class Code:	0x75	Data Type:	D
Instances:	1		

2.1.4.1. Attributes

wx0100	Composite wx block	Struct	na	Composite of entire block
wx0101	Tare Scale Status	By	rt	0 = Tare completed successfully 1 = Tare in progress 2 = Scale in motion during tare 3 = Pushbutton tare not enabled 4 = Programmable tare not enabled 5 = Chain tare not permitted 6 = Only incremental chain tare permitted 7 = Tare not in rounded increment value 8 = Tare value too small 9 = Taring when power up zero not captured 10 = Taring over capacity 11 = Taring under zero 12 = Tare value exceeds limit 13 = Must clear tare at gross zero 98 = Invalid tare function parameter 99 = Cannot access tare sd trigger
wx0102	Clear Tare Status	By	rt	0 = Success 1 = Command In Progress 4 = Programmable tare not enabled 98 = Invalid tare function parameter
wx0103	Print Scale Status	By	rt	0 = Printing completed successfully 1 = Printing in progress 2 = Print connection not found 3 = Busy 4 = Printing error 5 = Not ready to print 6 = Scale in motion 7 = Scale overcapacity 8 = Scale under zero 9 = Print request armed 10 = Ready to print 11 = Scale in expanded mode 12 = Scale bad zero 98 = invalid print function parameter

				00 = Cannot access print sd trigger
wx0104	Zero Scale Status	By	rt	0 = Success 1 = Command In Progress 2 = Scale motion during zero 3 = Illegal scale mode during zero 4 = Invalid – out of zero range 98 = Invalid zero function parameter 99 = Cannot access zero sd trigger
wx0105	Switch to Primary Units Status	By	rt	0 = Success, 1 = Command In Progress
wx0106	Switch to Secondary Units Status	By	rt	0 = Success, 1 = Command In Progress
wx0107	Toggle primary/secondary status/ 3rd unit	By	rt	0 = Success, 1 = Command In Progress
wx0112	Restart Filtering Status	By	rt	0 = Success, 1 = Command In Progress
wx0115	Write to EEPROM Status	By	rt	0 = Success, 1 = Command In Progress
wx0117	Toggle High Prec. Wt. Status	By	rt	0 = Success, 1 = Command In Progress
wx0118	Switch to Display of Aux Units	By	rt	0 = Success, 1 = Command In Progress
wx0131	Motion	Bl	rt	0 = No. 1 = Yes.
wx0132	Center of Zero	Bl	rt	0 = No. 1 = Yes.
wx0133	Over Capacity	Bl	rt	0 = No. 1 = Yes.
wx0134	Under Zero	Bl	rt	0 = No. 1 = Yes.
wx0135	Net Mode	Bl	rt	0 = No. 1 = Yes.
wx0138	Weight Data OK	Bl	rt	0 = No. 1 = Yes.
wx0139	IDNET in Motion Error	Bl	rt	0 = No. 1 = Yes.
wx0141	Stored Weight Mode	Bl	rt	
wx0145	x10 Weight Display	Bl	rt	1 = x10 mode, 0 = normal mode
wx0146	MinWeigh LOW Indication	Bl	rt	1 = Net weight below MinWeigh threshold
wx0150	Zero request	Bl	rt	Zero request in Timed Zero function

2.1.4.2. Methods

The Resident Scale Task sets the first set of statuses to reflect the status of commands to the scale. The second set of statuses show the dynamic run-time status of the scale weight.

2.1.5. Working Scale Setup Data (WK)

Access:	"Supervisor" Level Access.
Class Code:	Data Type: PP
Instances:	1

2.1.5.1. Attributes

wk0100	Composite wk block	Struct	na	Composite of entire block
wk0101	Auto-Tare Threshold	D	rt	Sets in current primary units.
wk0102	Auto-Tare Reset Threshold	D	rt	Enabled by ct0105
wk0103	Auto-Clear Tare Threshold	D	rt	Enabled by ct0106
wk0104	Preset Tare	D	rt	Application can load weight value here to establish a preset tare.
wk0105	Rate Measurement Interval	By	na	0 = Every second. 1 = Every 5 seconds. 2 = Every ½ second.
wk0106	Rate Sample Time Interval	By	na	Number of intervals over which the IND570 averages the rate. Set from 1 to 60 intervals.
wk0116	MinWeigh Uncertainty Factor "U_0"	D	na	Accuracy uncertainty as applied load approaches 0. Entered as weight value in primary units.
wk0117	MinWeigh Tolerance	D	Na	Values from 0.1 to 99.9
wk0118	MinWeigh Safety Factor	By	na	1 to 10
wk0119	MinWeigh Weight Value	D	Na	Weight result of direct entry or calculation
wk0125	MinWeigh Uncertainty factor "c"	D	rt	Uncertainly factor related to the portion of uncertainty in measurement that is proportional to the applied load.

2.1.5.2. Method

This block contains setup for data that may change during run-time. Rate, particularly, may change in a process control environment. However, for some features, these fields are static setup data that never changes.

RATE is the rate of change of weight normalized to the selected weight and rate units.

- cs--08 defines the rate weight units. cs--07 defines the rate time units in either seconds, minute, or hours.
- The Rate Measurement Interval in wk--05 specifies how often the IND570 calculates a new rate value. The permissible selections are 1 second, 5 seconds, and ½ second.
- The Rate Sample Time Interval is in wk--06. It is length of the sampling period used for the IND570's Rate calculation. Permissible values are from 1 to 60 seconds. Rate calculates the "delta weight" or change in weight from the previous interval. Rate stores this new delta weight in an array of delta weights. It calculates the rate as an average delta weight over all intervals in most recent sample time. For example, if the sample time is set to 10 seconds and interval time is set to one second, the rate is the normalized average of the 10 most recent delta weights. Shorter sample times reflect more accurately the instantaneous changes in the rate,

but often have much greater fluctuations in rate values. With longer sample times, the rate changes more slowly and smoothly because the rate is calculated over a longer time.

- The IND570 calculates the delta weights using the fine gross weight. It stores the calculated rate in wt--14 in the "fine" resolution. Rate rounds the displayed rate to the x10 resolution of the scale's division size. For example, if the scale weight resolution is xxx.x, then displayed rate resolution is xxx.xx. It stores the displayed rate as a string in the wt--08.

2.1.6. Scale Setup (CS)

Access:	"Maintenance" Level Access		
Class Code:	0x67	Data Type:	PS
Instances:	1		

2.1.6.1. Attributes

cs0100	Composite cs block	Struct	na	Composite of entire block
cs0101	Scale Type	By	na	65 = Analog Scale 69 = Remote Scale 71 = IDNet High-Precision Scale 78 = None
cs0103	Scale ID	S21	na	Text Identifier name for scale
cs0104	Third Weight Units	By	na	0 = none, 1 = pounds, 2 = kilograms, 3 = grams, 4 = metric tons, 5 = tons, 6 = lb-oz,7 = troy ounces, 8 = penny weights, 9 = ounces, 10 = custom units
cs0105	Enable Permanent High Precision Wt.	Bl	na	0 = Disable. 1 = Enable. Enable high-precision weight display to include an additional decimal digit beyond the specified division size for permanent display on IDNET bases
cs0107	Rate Period (Time Units)	S2	rt	**N**o, **S**ec, **M**in, **H**our
cs0108	Rate Weight Units	By	na	0 = None, 1 = Primary, 2 = Secondary.
cs0112	Custom Units Name	S13	na	3 characters can be displayed on the terminal
cs0113	Custom Units Conversion Factor	D	na	
cs0114	Low-Pass Filter Corner Frequency	D	na	0 to 9.9 Hz. 0 = Disables filter. The filtering routines select the closest available filtering setting to your selection and write it back into this field.
cs0115	Low-Pass Filter Poles	By	na	2, 4, 6, 8
cs0116	Notch Filter Frequency	D	na	For Analog Scale Bases only. 0 to 99 Hz. The filtering routines select the closest available filtering setting to your selection and write it back into this field.
cs0118	Ultra-Stability Filter Enable	Bl	na	0 = Disabled. 1 = Enabled. Do not use with process weighing.

cs0120	Units Switch Enable	Bl	na	0 = Disabled. 1 = Enabled.
cs0121	Output Rate of Continuous Output	By	na	0 = Default (20 Hz) 1 = 20 Hz – High update rate for process control applications 2 = 10 Hz – Mid-speed update rate 3 = 5 Hz – Low update rate for transaction applications *Values other than 0, 1, 2, or 3 will result in a 20 Hz rate.
cs0125	Custom Units Increment Size	D	na	Custom Units Increment Size
cs0129	MinWeigh Feature	By	na	0 = Disabled. 1 = Enabled.
cs0130	MinWeigh Entry Mode	By	na	0 = Calculated. 1 = Direct.
cs0132	Timeout	By	na	0 = Command is executed immediately regardless of motion. 1-98 = Terminal will wait from 1 to 98 seconds for motion before command is aborted. 99 = Terminal will wait indefinitely for a no-motion condition before executing command.
cs0140	IDNet Restart/Reset	S13	rt	"F MR" Message specific to IDNet base
cs0141	IDNet Approval code	S13	rt	" A " Message Approval code for IDNet base, for example, "USA N"
cs0142	IDNet Scale Update Rate	S25	na	"F MF" Message specific to IDNet base
cs0143	IDNet Scale Vibration Adapter	S25	na	"F MI" Message specific to IDNet base
cs0144	IDNet Weighing Process Adapter	S25	na	"F ML" Message specific to IDNet base
cs0145	IDNet Automatic Stability Detection	S25	na	"F MS" Message specific to IDNet base
cs0146	IDNet Auto-Zero Setting	S25	na	"F MZ" Message specific to IDNet base
cs0147	IDNet Software Part Number	S12	na	"P" Msg xxxx-x-xxxx string from IDNet base
cs0148	IDNet Calibration Ident Code	S3	na	"I" Msg 00 to 99 calibration count from IDNet
cs0149	Analog Load Cell Number (570x only)	By	na	Value 0-4 (Default = 1)
cs0150	Analog Load Cell Impedance (570x only)	UL	na	Value 0-9999
cs0173	Scale Class	By	na	1 = I, 2 = II, 3 = III (default), 4 = III HD, 5 = III L, 6 = IIII
cs0174	Verified Interval	By	na	0 = e = d (default), 1 = e = 10d

2.1.6.2. Methods

2.1.6.2.1. Filtering

The goal of filtering the weight counts is to remove the internal and external noise from the weight signal. Ideally, users of weight indication would like instant response to a weight input (settling time = 0), and immunity from all signal disturbances. In practice, in selecting a filter, you must trade off settling time and disturbance rejection to find an acceptable compromise.

There are two major classes of weighing applications: transaction and process weighing. In transaction weighing, a load to the scale base is more or less a step input, and the user only wants the actual static weight value of the load. Most shipping, vehicle, food, and service scales fall into this category. Settling time requirements typically range from 0.5 seconds in service scales to several seconds in vehicle or livestock scales. Disturbance rejection requirements vary widely within this weighing classification, but usually there is a need for a very stable final weight reading.

In process weighing, automation equipment or humans continuously add the load over some time. Even though only the final weight reading may be preserved, knowledge of the time varying weight reading is important during the weighing process. Batching, filling, and in-motion weighing fall into this category. Settling time requirements are usually more relaxed because the "final" settling time for a ramp input is less than that of the same load applied as a step input. Disturbance rejection is important since many types of automation equipment introduce vibrations. Stability of the "final" value is somewhat less important.

IND570 filtering has a large range of adjustment for both disturbance rejection and settling time to meet all Application requirements. Since these two parameters are dependent, some experimentation is usually required to find the best fit for the Application.

The following describes the Analog Load Cell Interface filtering. The IND570 Analog Scale Interface provides a 366 Hz A/D sampling rate, which permits highly effective digital filtering. Since most of the filtering is digital, it is easily adjusted over a wide range of selections via soft switch setup to meet specific site needs. IND570 has three types of configurable digital filters:

1. Low Pass Filter

All weighing applications use the low pass filter. The user can specify the corner frequency of the pass band and the slope of the transition band. The pass band extends from DC (0 Hz) to the corner frequency. The low pass filter accepts the frequencies within this low-pass range with little or no attenuation, but attenuates frequencies above the pass band according to the slope of the transition band.

The scale is measuring the DC signal (static weight), so it is tempting to make the corner frequency very low to reject all "noise". However, the narrower the pass band, the longer the delay or settling time before we get the final value. As the corner frequency is increased, the scale will settle faster, but will also allow more noise through.

The transition slope describes the rate of change of the attenuation once outside the pass band. The steeper the slope, the more effective a filter is at rejecting a disturbance that is near the corner frequency. Making the slope infinite will cut off all frequencies above the corner. Again the price is delay; the steeper the slope, the longer the settling time.

The IND570 provides a multi-pole Infinite Impulse Response (IIR) low pass digital filter, with Service Technician control over both the filter corner frequency and the sharpness of the transition band slope. The corner frequency is defined in Hz; its adjustment range is 0.1 through 9.9 Hz. The number of filter poles defines the band slope. There can be 2, 4, 6 or 8 poles. This large range of adjustability provides effective filtering for almost any situation.

2. Notch Filter

An ideal notch filter provides infinite attenuation at a single frequency, and little or no attenuation at other frequencies. This type of filter is useful in special cases where there is a single noise frequency near or below the corner frequency of the low pass filter. In such cases, use of the notch filter can provide additional attenuation for a troublesome noise source and may permit opening the pass band of the low pass filter for a faster step response. The IND570 implements the notch filter as a Finite Impulse Response (FIR) filter, and provides the fundamental notch plus additional notches at multiples of the fundamental notch frequency. Specifying the notch frequency in Hz adjusts the notch filter. The notch filter is applicable to all weighing applications, but only to the Analog Load Cell scale.

3. Ultra-Stability filter

Ultra-Stability Filtering algorithm is for use in transaction applications where it is very difficult to achieve stable weight readings due to excessive motion on the scales. Examples are truck scales in very windy locations and livestock weighing scales. The Ultra-Stability filtering algorithm uses the standard low-pass filtering as long as there is a rapid motion on the scale so that the operator can also observe the weight changing. When the motion begins to die down, this algorithm switches to a very stiff filter that strongly dampens any noise on the scale. Then, the operator can record a stable weight reading. Process weighing applications cannot use the ultra-stability filter, since the non-linear action of the filter switching may cause inaccurate cutoffs in batching or filling applications.

2.1.7. Scale Tare Setup (CT)

Access:	"Administrator" Level Access		
Class Code:	0xB7	Data Type:	PS
Instances:	1		

2.1.7.1. Attributes

ct0100	Composite ct block	Struct	na	Composite of entire block
ct0101	Tare Enabled	Bl	na	0 = Disabled. 1 = Enable Tare feature. Requires qc0149 be written to "1" to fully execute.
ct0102	Pushbutton Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0103	Keyboard Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0104	Auto-Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0105	Re-arm Auto Tare (Requires No Motion)	Bl	na	1 = Re-arm Auto Tare only when there is no motion after weight falls below Re-arm threshold (wk0102)
ct0106	Auto-Clear Tare Enabled	Bl	na	0 = Disabled. 1 = Automatically clear tare when weight falls below Auto-clear Weight Threshold (wk0103)

ct0107	Auto-Clear Tare after Print	Bl	na	0 = Disabled. 1 = Enabled.
ct0108	Auto-Clear Tare Motion	Bl	na	0 = Disabled. 1 = Enabled.
ct0112	Weights & Measures Interlock	Bl	na	0 = Disabled. 1 = Enabled.
ct0113	Net-Sign Correction Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0114	Terminal tare enable	Bl	na	0 = Do IDNet tare. 1 = Terminal tare
ct0115	Additive tare enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0118	Reset tare on power-up	Bl	na	0 = Restart with current tare. 1 = Reset the tare to zero on power-up.
ct0119	Clear Tare on Zero	Bl	na	0 = Disabled. 1 = Clear Tare when scale is zeroed
ct0122	Tare Display	By	rt	0 = Disabled, 1 = Active (default), 2 = Always

2.1.7.2. Methods

Tare is the weight of an empty container. The IND570 can mathematically eliminate this weight from the gross weight and show only the contents, or net weight. The IND570 always displays the gross, net, and tare weights using the same display resolution and units. The IND570 always has tare weight available for recall and display, and it always identifies the tare weight. A tare weight of zero is illegal.

There are several methods for capturing tare:

Pushbutton Tare captures current weight reading as the tare weight upon operator command, at highest internal weight resolution available. There must be no motion on the scale for 3 seconds.

Auto-Tare captures the current weight as the tare weight when the current weight exceeds the upscale threshold weight, wk0101, and the scale reaches a "no motion" state. The IND570 resets the auto-tare trigger when the weight falls below a downscale threshold, wk0102, and the scale is in an optional stable weight condition. There must be no motion on the scale

The IND570 accepts a Keyboard Tare or a Programmable Tare at either display resolution or full internal resolution. The operator may recall tare on demand. Application specific software packages can set the Programmable Tare weight in wk--04. The IND570 rounds the Tare to the scale display resolution before using it in calculations. Canadian W&M requires keyboard tare to be entered at the scale display resolution.

Auto-Clear Tare operates in conjunction with Auto-Tare. It automatically clears the tare after the following sequence occurs: 1) weight exceeds an upscale weight threshold, 2) a stable reading is taken, 3) weight falls below Auto-Clear Tare threshold (wk0103), 4) Auto-Clear Tare is carried out. You may also set the IND570 to automatically clear tare after the IND570 prints.

Net Sign Correction delays the decision of which weighment is the gross weight and which weighment is the tare weight until a ticket is printed. At that time, the IND570 compares the two weighments and takes the lower weight as the tare weight, so the net weight is always a positive value. It resolves this dilemma:

Weigh a full truck first and, after emptying the truck, take the tare weight of the empty truck to find the net weight of the contents.

Take the tare weight of an empty truck first and, after loading the truck, take the full weight of the truck to find the net weight of the contents.

Tare Interlock, the only tare configuration field the **Weights & Measures** seal protects, enforces the following operations:

- Incremental chain tares only (Europe & Australia).
- Cannot perform chain tares (USA).
- Only capture tare in first range of a multi-range or multi-interval scale.
- Must capture Power-Up Zero before capturing a Tare weight.
- May clear Tare only at Gross Zero.

IDNET Tare Option. The IND570 enforces taking tare through the high precision base when the Legal-for-Trade switch is ON. The Legal for Trade switch option takes precedence over the setup selection to manage IDNet Tare within the IND570 rather than within the high-precision base.

For **Multi-Interval weighing (Europe and Australia)**, you may take Pushbutton and Auto Tare in any interval. In Legal for Trade mode, Preset Tare entries must be within the lowest interval. The IND570 generates an error message when the entry is too large. If not in Legal for Trade mode, Preset Tare entries may be in any interval. In the U.S. Legal for Trade mode, all tare entries must be in the lowest weighing range.

2.1.8. Scale Zero Setup (ZR)

Access:	"Administrator" Level Access.		
Class Code:		Data Type:	PC
Instances:	1		

2.1.8.1. Attributes

zr--00	Composite zr block	Struct	na	Composite of entire block
zr--01	Power-Up Zero Capture Positive Range	By	na	% of capacity (0-99)
zr--02	Power-Up Zero Capture Negative Range	By	na	% of capacity (0-99)
zr--03	Pushbutton Zero Positive Range	By	na	% of capacity (0-99)
zr--04	Pushbutton Zero Negative Range	By	na	% of capacity (0-99)
zr--05	Auto-Zero Maintenance Window	US	na	Number of $1/10^{th}$ divisions for AZM Window. Legal values are 0 – 99 $1/10^{th}$ divisions. 0 = Disabled.
zr--06	Under-Zero Divisions	By	na	0-99 divisions. Number of divisions at which the under-zero indication is set on the display. "99" disables the under-zero display.
zr--07	Pushbutton Zero	By	na	0 = Disabled. 1 = Enabled
zr--08	Auto-Zero in Gross Mode	By	na	0 = Disabled. 1 = Enabled

zr--09	Auto-Zero in Gross & Net Mode	By	na	0 = Disabled. 1 = Enabled
zr--10	Zero-Indication in Gross Mode	By	na	0 = Disabled. 1 = Enabled
zr--11	Zero-Indication in Gross & Net Mode	By	na	0 = Disabled. 1 = Enabled
zr--12	Reset to Calibrated Zero on Power-Up	Bl	na	0 = Restart with current zero, 1 = Reset to calibrated zero
zr--13	Timed Zero	By	na	Total time for Timed Zero to detect zero, in minutes. 0 = Disabled (default), 1 = 10, 2 = 15, 3 = 30
zr--15	Time Value Zero Request OFF	By	na	Time of Zero Requested output OFF then ON constant, default value 200ms
zr--99	EEPROM Block Checksum	US	na	

2.1.8.2. Methods

Zero is the interval between –0.5d and +0.5d, where "d" is a division or display increment.

Center of Zero is the interval between –0.25d and +0.25d in most market regions. In Canada, Center of Zero is the interval between -0.20d and +0.20d. Center of Zero is a Boolean system output that is TRUE when the display reading is in the center of zero range. IND570 evaluates Center of Zero at each new weight update. Metrology regulations usually require that the scale must show a Center of Zero status indication to the user at the primary weight display. Some jurisdictions require that the indication be present only while in gross weight mode, others require it in both gross and net mode.

When the service technician calibrates the scale, the IND570 records the Calibrated Zero reading internally. The IND570 also maintains a separate Current Zero reading that compensates for conditions that may change the scale so that it no longer indicates zero when the platform is empty. Such conditions include thermal effects and the accumulation of matter on the scale. The Center of Zero output is an indication of the quality of the Current Zero. There are several methods available to establish a new Current Zero reading. In each case, there are limits applied to the acceptance of this command by the scale.

On system power up, the IND570 automatically attempts to establish a new Current Zero. The Power-up-Zero logic establishes a Current Zero when the present scale reading is stable and falls within the allowed tolerance from Calibrated Zero. This Power-up-Zero tolerance is the percentage of the scale capacity, specified for (+) and (–) tolerance limits. The service technician can disable Power-up-Zero.

Either the operator or a remote device can also attempt a Pushbutton Zero command. This command succeeds if the scale reading is stable and falls within its allowed tolerance from the Calibrated Zero. The Pushbutton Zero tolerance limits are a percentage of scale capacity, specified for (+) and (–) tolerance limits. The service technician can disable Pushbutton Zero.

The IND570 also provides **Automatic Zero Maintenance** or AZM. Within the AZM operating range, the IND570 makes small adjustments to the Current Zero reading to drive the weight reading toward true numeric zero. This feature operates only within a small range around true zero. The AZM moves

toward zero at a rate of correction (correction amount per unit time) of 0.07 increments per second. zr0105 configures the operating range of this feature in number of scale increments. Setting zr0105 to 0 disables Automatic Zero Maintenance.

Under-Zero Divisions are the maximum number of display increments below zero that the scale will operate. When the weight falls below the Under-Zero Divisions, the weight display shows only an error display, the Under Zero logical status output is TRUE, and IND570 indicates that the weight transmitted is invalid. Setting the Under-Zero Divisions to 99 disables the under-zero check.

IDNET Power-Up Restart sets the power up operation of the IDNET base. When Restart = Disabled, the IND570/high precision base clears the current tare and enforces a re-zeroing of the base after a restart of the base. When Restart = Enabled, the IND570 terminal/high precision base preserves the current zero and tare values after a restart of the base.

The IND570 protects the Zero Configuration Settings when the Weights and Measures seal is in place.

2.1.9. Scale Totalization Process Data (TZ)

Access:	"Supervisor" Level Access.		
Class Code:		Data Type:	PP
Instances:	1		

2.1.9.1. Attributes

tz0100	Composite tz block	Struct	na	Composite of entire block
tz0101	Grand Total Weight	D	na	Displayed in primary units only.
tz0102	Grand Total Transaction Counter	UL	na	
tz0103	Subtotal Weight	D	na	Displayed in primary units only.
tz0104	Subtotal Transaction Counter	UL	na	

2.1.9.2. Method

Each time a Demand Print transaction occurs, the IND570 adds the weight value to the totalization for the scale according to the setup selections in the TS block.

2.1.10. Totalization Setup (TS)

Access:	"Supervisor" Level Access. ts0101 and ts0100 are "Maintenance" level.		
Class Code:		Data Type:	PS
Instances:	1		

2.1.10.1. Attributes

ts0100	Composite ts block	Struct	na	Composite of entire block
ts0101	Grand Total Enable	By	na	Automatically add Demand Print weight to Grand Total

				weight: 0 = No, 1 = Gross Weight, 2 = Net Weight.
ts0102	Clear Grand Total on Totals Print	Bl	na	0 = No. 1 = Clear the Grand Total after printing the Grand Totals.
ts0103	Subtotal Enable	By	na	Automatically add Demand Print weight to Subtotal weight: 0 = No, 1 = Gross Weight, 2 = Net Weight.
ts0104	Clear Subtotal on Totals Print	Bl	na	0 = No. 1 = Clear the Subtotal after printing the Subtotals.
ts0105	Units for Adding to Totals	By	na	Only add Demand Print weight to totals under the following conditions: 0 = Printing weight in Primary Units Only 1 = Printing weight in Secondary Units Only 2 = Printing weight in any units.

2.1.10.2. Method

Each time a demand print transaction occurs, the IND570 adds the weight value to the Totalization for the scale according the setup selections in this block. Scale Grand Totals, Subtotals, and Sequential Numbers are stored in the Process Data (TZ) block.

2.1.11. System Process Data (XT)

Access:	"Read Only" Access		
Class Code:	0x7C	Data Type:	PP
Instances:	1		

2.1.11.1. Attributes

- **Note**: The last two digits of each shared data variable is its attribute.

xt0100	Composite xt block	Struct	na	Composite of entire block

2.2. Calibration and Monitoring

2.2.1. Scale Calibration (CE)

Access:	"Administrator" Level Access, customizable by individual field		
Class Code:	0x72	Data Type:	PC
Instances:	1		

2.2.1.1. Attributes

ce0100	Composite ce block	Struct	na	Composite of entire block

Multi-Range Parameters

ce0103	Primary Units	By	na	0 = none 1 = pounds	3 = grams 4 = metric tons

				2 = kilograms	5 = tons
ce0104	Number of Ranges/Intervals	By	na	1 = 1 range, 2 = 2 ranges, 3 = 3 ranges, 4 = 2 intervals, 5 = 3 intervals	
ce0105	Low Range Increment Size	D	na	Increment size is in Calibration units	
ce0106	Mid-Range Increment Size	D	na	Multi-ranging parameters are in Calibration units.	
ce0107	High Range Increment Size	D	na	Multi-ranging parameters are in Calibration units.	
ce0108	Scale Capacity in Single Range Setup or Low-Mid Range Threshold Switch point	D	na	Scale capacity when only one range is enabled. Units are the same as Calibration units.	
ce0109	Mid-High Range Threshold Switch point	D	na	Multi-ranging parameters are the same as Calibration units.	
ce0110	Highest Capacity in Multiple Range Setups	D	na	Scale capacity units are the same as Calibration units	
ce0111	Secondary Units	By	na	0 = none 1 = pounds 2 = kilograms 3 = grams 4 = metric tons	5 = tons 6 = lb-oz 7 = troy ounces 8 = penny weights 9 = ounces 10 = custom units

Calibration Parameters

ce0119	Calibration Units	By	na	0 = none 1 = pounds 2 = kilograms	3 = grams 4 = metric tons 5 = tons

Standard Linear Calibration Points

ce0120	Zero Calibration Counts	L	na	Zero calibration point for all scales
ce0121	High Calibration Counts	L	na	High calibration point for all calibrated scale bases. Weight is in calibration units
ce0122	High Calibration Weight	D	na	Units as set in ce0119.

First Point of Calibration for Non-Linearity

ce0123	Mid Calibration Counts	L	na	Calibration point for non-linear scale bases with 1, 2, or 3 points of non-linearity.
ce0124	Mid Calibration Weight	D	na	Weight is in calibration units.
ce0125	Calibration Gravity "Geo" Code	By	na	Value 0 – 31 This value represents the gravitational acceleration depending on the latitude and altitude of the specific location where the IND570 was last calibrated. The IND570 uses it to adjust the calculated weight value when you calibrate the IND570 in one location and operate it in a different region of the world. Any value other than 0-31 disables this feature.

ce0126	Motion Stability Sensitivity	US	na	Sensitivity in tenths (1/10) of divisions
ce0127	Motion Stability Time Period	US	na	Time in tenths of seconds
ce0132	Over Capacity Divisions	By	na	# of display increments that the terminal is allowed to go over capacity. Available for analog load cells only.
ce0133	# of Upscale Test Points	By	na	1, 2, 3, or 4. Typically, there is only one upscale calibration point. For non-linear scale bases, two additional calibration points can help correct for the non-linearity. You may also use these additional "non-linearity" points to see more weight resolution in the higher ranges of a multi-ranging scale.
ce0134	Over Capacity Blanking	Bl	na	0 = "Disabled". Sets divisions to 99 on terminal display only. 1 = Enabled. Scale display blanks when weight exceeds the capacity of the scale plus the over capacity divisions stored in ce0132.
ce0137	Last Calibration Date & Time	AL2	na	In 1 second interval.
ce0138	Base Serial Number	ABy14	na	Serial # of Scale Base. Each character stored in ASCII decimal values.

Second Point of Calibration for Non-Linearity

ce0139	Low Calibration Counts	L	na	Additional Calibration point for non-linear scale bases with 2 or 3 points of non-linearity.
ce0140	Low Calibration Weight	D	na	Weight is in calibration units.

CALFREE Calibration Parameters

ce0141	Use Calculated Calibration	Bl	na	0 = No. 1 = Yes.	
ce0142	Load Cell Capacity	D	na	Load Cell Sensor Capacity (example: 5000 kg)	
ce0143	Load Cell Capacity Units	By	na	1 = pounds 2 = kilograms 3 = grams	4 = metric tons 5 = tons
ce0144	Rated Load Cell Output	D	na	Sensor output at the rated capacity weight, in mV/V (example 2.0 mv/V)	
ce0145	Gain Jumper	By	na	2 = 2mv/V 3 = 3mV/V (default)	
ce0146	Estimated Preload	D	na	Estimated preload is optional. If entered, the system can check for saturation of the A/D input.	
ce0147	Estimated Preload Units	By	na	1 = pounds 2 = kilograms 3 = grams	4 = metric tons 5 = tons
ce0148	Calculated Calibration Gravity "Geo" Code	By	na	Gravity "Geo" code of factory that calibrated load cell. Value is 0 – 31.	

Third Point of Calibration for Non-Linearity

ce0150	XLow Calibration Counts	L	na	Additional Calibration point for non-linear scale bases with 3 points of non-linearity.
ce0151	XLow Calibration Weight	D	na	Weight is in calibration units.
ce0199	EEPROM Block Checksum	US	na	

2.2.1.2. Methods

Motion/Stability is a measure of whether the weight has settled on the scale. Metrology regulations generally prohibit a weighing system from recording a measurement before the system has settled. The RST uses the Scale Motion/Stability status as an interlock for triggering a Pushbutton Tare command or for triggering a Print command. The IND570 examines the weight readings over a period of time to determine Motion/Stability of a scale. The weight readings over a chosen interval of time T must not differ from one another by more than the tolerance value V. The Service Technician can set the level for motion detection.

Over-Capacity Divisions are the number of display increments beyond the nominal scale capacity that the scale will operate. When the weight display exceeds the Over-Capacity Divisions, the weight display shows only an error display, the Over-Capacity logical status output is TRUE, and IND570 indicates that the weight transmitted is invalid. The Service Technician cannot disable the Over-Capacity checking.

The Units of Measure that the IND570 fully supports are:

- MKS – metric tons (t), kilograms (kg), grams (g)
- Avoirdupois – tons (ton), pounds (lb)
- troy ounces (toz), pennyweights (dwt), ounces (oz), and custom units as secondary units only
- The IND570 uses these fully supported units, as follows:
- Calibration Units define the units of calibration test weights.
- Primary Units are the preferred units of measure.
- Secondary Units are the alternate units when using units switching function. The IND570 can also display the Secondary units on the main display

With Multiple Range weighing, there can be up to three weighing ranges and each has a threshold. Each weighing range extends from zero to its range threshold. Each range has an associated increment size. The increment size and threshold value are larger for each successive weighing range from the lowest to highest ranges. The difference between the largest and smallest increment size is at most one decimal place. You manually set the increment sizes and thresholds in setup.

The IND570 only supports automatic selection of the "current weighing range". When weight is increasing, the current weighing range proceeds from the lower range to the next higher range once the weight exceeds the range threshold. Switchover to the next higher range occurs at the range threshold. When weight is decreasing, the current weighing range returns from the current weighing range to the lowest range only when the weight falls within half-a-division of zero.

The IND570 weight display must clearly indicate the current weighing range. The terminal indicates weighing ranges 1, 2, and 3 respectively. The terminal maintains the same decimal point position

in the Displayed Weight even when the current weighing range changes. There is, at most, one trailing, non-significant "0". When right of the decimal point, the non-significant "0" must be in the third place to the right of the decimal point. You may take a Tare in any weighing range. The Displayed Weight and Printed Weight are always the same.

In Gross Mode, the IND570 determines the current weighing range by comparing the Fine Gross Weight to the range thresholds. If the scale is within half-a-division of zero, the terminal returns to the lowest weighing range as the current weighing range. The IND570 calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing range.

In Net Mode, the terminal determines current weighing range by comparing the Fine Gross Weight to the range thresholds. If the scale is within half-a-division of zero for gross mode, the terminal returns to the lowest weighing range as the current weighing range. The IND570 terminal calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the current weighing range. The IND570 calculates the Displayed Tare Weight by rounding the Fine Tare Weight to the nearest weight increment for the current weighing range. Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight.

Multi-Interval weighing rules only apply when the scale base is a high precision base. There can be up to three weighing intervals. Each weighing interval has a threshold. Each weighing interval extends from the threshold of the next lower interval to its threshold. Each interval has an associated increment size. The increment size and threshold value are larger for each successive weighing interval from the lowest to highest intervals. The high precision base sets the increment sizes and thresholds. The terminal only supports automatic selection of the "current weighing interval". The IND570 display must clearly display the current weighing range. Displayed Weight and Printed Weight are always the same.

In Gross Mode, the IND570 determines the current weighing interval by comparing the Fine Gross Weight to the interval thresholds. The terminal calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing interval.

In Net Mode, the IND570 determines the "net weight current weighing interval" by comparing the Fine Net Weight to the interval thresholds. It calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the "net weight current weighing interval". The terminal determines the "tare weight current weighing interval" by comparing the Fine Tare Weight to the interval thresholds. It calculates the Displayed Tare Weight by rounding the Fine Net Weight to the nearest weight increment for the "tare weight current weighing interval". Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight.

2.2.1.2.1. Weights & Measures Compliance

Automatic Multi-Ranging is not compliant with the U.S. and Canadian regulations for Legal for Trade operation.

2.2.1.2.2. Calibration

The IND570 supports seven modes of scale calibration. These are:

- Standard, Two-Point Linear Calibration is the standard mode for calibrating the large majority of scales. You measure the scale counts at the zero weight and at a span weight of the scale.

- Three Point Calibration enables calibration of a scale with one intermediate point of non-linearity.
- Four Point Calibration enables calibration of a scale with two intermediate points of scale non-linearity.
- Five Point Calibration enables calibration of a scale with three intermediate points of scale non-linearity.
- CALFREE measures to zero weight of the scale and calculates the span value of the scale based on the weighing parameters of the load cell and the analog A-to-D circuitry.
- Zero Adjust Calibration adjusts only the zero value of the scale. It is valid for use with all modes of calibration.
- Span Adjust Calibration adjusts only the span value of the scale in a standard, two-point linear calibration.

2.2.1.2.3. Calculated Calibration for Analog Load Cell Weighing Systems

Calibration using test weights is difficult or even impossible for large tank or hopper scales used in process weighing applications. Establishing a zero balance is easy, but it is frequently difficult to place a significant amount of calibrated test load on the scale. Service technicians routinely calibrate such scales in the field with test loads of less than 5% of scale capacity. Then, they use a "step test" using water or some other cheap material as a rough check of linearity performance. This type of span calibration is often less accurate than a mathematically calculated field calibration. When service technicians cannot apply test weights to a tank scale, they must use calculated field calibration (CalFree) as the only recourse.

CalFree calculated calibration requires that both the sensor(s) and the A/D converter be independently calibrated and their output gains known. As an added benefit, if the factory calibrates both the A/D converter and sensors with sufficient accuracy, service technicians can replace either device in the field with another device of the same type without performing a new field calibration.

The factory must calibrate the A/D converter to a common and known gain and offset for all devices of its type. The factory calibrates all IND570 Terminal A/D converters at two points:

Load Cell Input	Terminal Output
0 mV/V	0 counts
2 mV/V	1,000,000 counts

After factory calibration, all such devices have an A/D gain = 500,000 counts / mV/V. The factory must calibrate the A/D converter for each jumper setting of 2 mv/V and 3 mv/V. Refer to "bc" block definition.

The second requirement is that the factory calibrates the sensor device(s) and publishes the output gain. We express the load cell sensor gain as electrical output in mV/V at the rated mechanical input, typically in units of mass in pounds or kilograms. When you mount multiple identical load cells mechanically in parallel, the total sensor gain is the same as the gain for any one cell. This is typical for most multi-cell scales.

Example: The customer constructs a hopper scale using three load cells, each rated at 2 mV/V output, 10,000 lb capacity. The service technical usually trims the load cells for zero output balance at no load, so:

Sensor gain = electrical output / mechanical input

= (0.0002 mV/V) / lb

Finally, the service technician must know the desired system capacity and units of measure.

Example: The desired system capacity is 5,000 kg.

System gain = (A/D gain) x (Sensor gain) x (Units Conversion)

= 500,000 counts/mV/V x 0.0002 mV/V/lb x 2.20462 lb/kg

= 220.462 counts/kg

While performing this computation, also the IND570 can also check for A/D saturation at full capacity. In order to perform this test, the service technician must provide the excitation voltage and an estimated preload weight. In actual operation, the weighing indicator replaces the estimated preload with an accurate field zero adjustment.

The IND570 excitation voltage is 10V. Assume that the hopper preload is 4500 kg (very large preloads are common in process weighing).

Full output = (preload + capacity) x (Sensor gain) x (Units Conversion) x (excitation voltage)

= 9,500 kg x 2.20462 lb/kg x 0.0002 mV/V/lb x 10V

= 41.9 mV

The IND570 will accept ~21 mV before saturation. This scale will not work properly for loads above 10% capacity!

2.2.1.2.4. Shortcomings and Warnings

In some cases computed calibration is ineffective or can operate in undesired ways:

- If the A/D converter provides multiple field selectable gain settings, such as a jumper to select 2mV/V or 3 mV/V load cells, the service technician must know the actual field gain selection. The weighing indicator must account for the differences in the calculations. Further, since such gain adjustment is not perfect, the factory must calibrate the A/D converter for each setting.
- Some junction boxes include potentiometers in each load cell's excitation or output wiring to allow field adjustment for corner errors. Since these resisters destroy all hope for accurate computed calibration, the service technician must disable them. There is little point to corner shift adjustment capability if the service technician cannot place test loads on the scale.
- A barrier device placed in the load cell wiring will usually cause severe gain and offset changes. For example, this often occurs when the load receiver is in a hazardous area. If the barrier is well characterized, we can include these factors in the calculations. However, since this is almost never the case, we must revert to revert to field calibration with test loads.

- Since A/D factory calibration is numeric only, results are highly accurate and repeatable. System accuracy remains virtually unaffected when swapping like A/D devices in the field without field calibration. Load cell calibration is analog in nature and difficult to perform with perfect accuracy. Maintaining system accuracy is correspondingly less certain when the service technician replaces a load cell. You must consult the vendor specifications for load cell trim to determine the system accuracy impact.
- The IND570 protects the Calibration Settings when the Weights and Measures seal is in place.
- The maximum capacity can be acceptable is 2000000.
- The increment can be acceptable is from 0.00001 to 500.0.
- Each range division can be acceptable is form 100d to 100000d
- The increment size and threshold value are larger for each successive weighing range from the lowest to highest ranges.
- The difference between the largest and smallest increment size is at most one decimal place.

2.2.2. Cell Shift Adjust (CX)

Access:	"Administrator" Level Access		
Class Code:	0x73	Data Type:	PC
Instances:	1		

2.2.2.1. Attributes

Note: The last two digits of each shared data variable is its attribute.

cx0100	Composite cx block	Struct	na	Composite of entire block
cx0101	Shift Constants 1 – 24	AL24	na	Contains one normalized long integer for each cell.
cx0199	EEPROM Block Checksum	US	na	

2.2.2.2. Method

The RST calculates the shift constants during the Shift Adjustment of a POWERCELL Scale, by solving a set of simultaneous equations. The scale board multiplies a shift adjustment factor to the raw counts for each cell on each weighment. The shift adjustment accounts for differences between individual cells in reporting weight when the same load is applied to the different cells. The RST uses the shift adjustment factor as a floating point number. When storing the shift adjustment factor as a LONG integer in Shared Data, the RST multiplies the floating point value by 1000000Hex.

2.2.3. Scale Monitoring & Service Data (WM)

Access:	"Read Only" Access.		
Class Code:		Data Type:	PP
Instances:	1		

2.2.3.1. Attributes

wm0100	Composite wm block	Struct	na	Composite of entire block

wm0103	Number of weighments since calibration	UL	na	Must have a value set in Calibration Management/Test Interval # of Weighments (cm0104) in order for this field to be active.
wm0104	Number of Platform Overloads	UL	na	
wm0106	Number of Zero Commands	UL	na	
wm0107	Number of Zero Command Failures	UL	na	
wm0111	Calibration Check Failure	By	na	0 = None. 1 = Last calibration failed.
wm0112	Number of Platform Underloads	UL	na	
wm0116	Total Number of Weighments	UL	na	Total Number of Weighments/Transactions.
wm0129	Last Transaction Day	AL2	na	Last day that the scale base ran at least one transaction.
wm0120	Total Transactions Per Day	AL7	na	Total number of Print Transactions in each of the last 7 days when the scale base ran at least one transaction.
wm0121	Transaction Day Pointer	By	na	Pointer to the next transaction day the IND570 will update Values 1-7.
wm0122	Last Used Day	AL2	na	Last day that the scale base ran at least one cycle.
wm0123	Usage Cycles Per Day	AL7	na	Usage cycle counter. Contains the number of times that the scale base exceeds 1% of the capacity of the base in each of the last 7 days when the scale base had at least one cycle.
wm0124	Usage Cycle Day Pointer	By	na	Pointer to the next usage cycle day entry the IND570 will update. Values 1-7.
wm0125	Average Peak Load	D	na	Running average of daily peak load. IND570 stores value in primary units.
wm0126	Usage Time Counter	UL	na	Cumulative use time in minutes. Contains the cumulative minutes for which the scale base weight is above 1% of the scale capacity.
wm0127	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0128	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0129	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0130	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0131	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0132	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.

wm0133	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0134	Peak Load Since Master Reset	D		Peak load on scale since the last master reset was performed.
wm0141	Number of Key Presses – C	UL	na	Records the number of key presses from 5 keys
wm0142	Number of Key Presses – P	UL	na	
wm0143	Number of Key Presses – T	UL	na	
wm0144	Number of Key Presses – Z	UL	na	
wm0145	Number of Key Presses – ENTER	UL	na	
wm0146	Number of Weighments Since Calibration	UL	na	For GWP Sensitivity Test.
wm0147	Calibration Check Failure	By	na	0 = None, 1 = Latest Calibration
wm0148	Number of Weighments Since Calibration	UL	na	For GWP Eccentricity Test.
wm0149	Calibration Check Failure (Eccentricity Test)	By	na	0 = None, 1 = Latest Calibration
wm0150	Number of Weighments Since Calibration	UL	na	For GWP Repeatability Test.
wm0151	Calibration Check Failure (Repeatability Test)	By	na	0 = None, 1 = Latest Calibration
wm0152	Current Battery Voltage	D	na	
wm0153	Current Excitation Voltage	D	na	
wm0154	Current Shared Data Server Login	By	na	Number of current SDS logins.

2.2.3.2. Method

All fields except for wm0112 will reset to zero (0) upon Master Reset.

The Scale Monitor counts significant processing events and errors. The Scale Monitoring Setup Block (CM) defines what events the Scale Monitor watches. An FTP Shared Data transfer can save these usage counters but does not restore them.

2.2.4. Scale Monitoring Setup (CM)

Access:	"Maintenance" Level Access		
Class Code:		Data Type:	PS
Instances:	1		

2.2.4.1. Attributes

cm0100	Composite cm block	Struct	na	Composite of entire block
cm0101	Next Scheduled Calibration	AL2	na	In 1 second intervals since 1970

	Test Date			
cm0102	Last Calibration/Service Date	AL2	na	In 1 second intervals since 1970. For Analog cells, this is the last calibration date. For IDNet bases, this is the last date to enter service mode.
cm0103	Calibration Interval in Days	US	na	Max number of days between calibrations.
cm0104	Calibration Interval in Weighments	L	na	Number of weighments between calibrations
cm0107	Calibration Expired Announcement	By	na	1 = No action. Log entry only; 2 = Disable scale and alarm; 4 = Alarm only
cm0136	Calibration Test Weight Edit	By	na	0 = Disabled; 1 = Enabled
cm0137	Next scheduled Sensitivity Test Date	AL2	na	In 1 second intervals since 1970
cm0138	Last Sensitivity Test Date	AL2	na	In 1 second intervals since 1970.
cm0139	Sensitivity Test Interval in Days	US	na	Maximum number of days between sensitivity tests
cm0140	Sensitivity Test Interval in Weighments	L	na	Maximum number of weighments between sensitivity tests
cm0141	Sensitivity Test Weight Edit	By	na	0 = Disabled; 1 = Enabled
cm0142	Sensitivity Expired Announcement	By	na	1 = No action. Log entry only, 2 = Disable scale and alarm; 4 = Alarm only
cm0143	Next Scheduled Eccentricity Test Date	AL2	na	In 1 second intervals since 1970
cm0144	Last Eccentricity Test Date	AL2	na	In 1seconds intervals since 1970.
cm0145	Eccentricity Test Interval in Days	US	na	Maximum number of days between eccentricity tests
cm0146	Eccentricity Test Interval in Weighments	L	na	Maximum number of weighments between eccentricity tests
cm0147	Eccentricity Test Weight Edit	By	na	0 = Disabled; 1 = Enabled
cm0148	Eccentricity Expired Announcement	By	na	1 = No action. Log entry only; 2 = Disable scale and alarm; 4 = Alarm only
cm0149	Next Scheduled Repeatability Test Date	AL2	na	In 1 second intervals since 1970
cm0150	Last Repeatability Test Date	AL2	na	In 1 second intervals since 1970.
cm0151	Repeatability Test Interval in Days	US	na	Maximum number of days between repeatability tests
cm0152	Repeatability Test Interval in Weighments	L	na	Maximum number of weighments between repeatability test
cm0153	Repeatability Test Weight Edit	By	na	0 = Disabled; 1 = Enabled
cm0154	Repeatability Expired Announcement	By	na	1 = No action. Log entry only; 2 = Disable scale and alarm; 4 = Alarm only

cm0155	Number of weighments in Repeatability Test	By	na	Number of weighing actions. Range: 0-20
cm0156	Battery voltage at calibration	D	na	BRAM battery voltage – measured and stored at calibration
cm0157	Excitation voltage at calibration	D	a	Excitation voltage – measured and stored at calibration

2.2.4.2. Methods

2.2.4.2.1. Calibration and GWP Management

The IND570 can enforce confirmation of Calibration or GWP status within a certain interval. The Service Technician specifies the interval either in number of days or weighments. Calibration and GWP management helps the Service Technician test and certify the accuracy of the scale. The scale must weigh test weights within a specified tolerance in the specified number of locations on the scale platform.

The Service Technician can certify the scale "as found" if he knows that the scale is weighing accurately. The IND570 can print a record of the Calibration or GWP test and save the results in the GWP Log. The IND570 can disable the scale, issue a local alert, or disable and issue a local alert when a calibration or GWP test fails.

3 Application Data

The Shared Data fields listed here in "Application Data" are fields that are available for use when creating Task Expert custom programming to run with the *basic* firmware for the IND570. When application software pacs, such as the Fill-570 and the Drive-570, are installed in the IND570 terminal, many of the application shared data variables in the chapter will have been used for those specific applications and may not be available to Task Expert.

Refer to Chapter 9 (Fill-570 Application Software) for Application Data fields that have been used in the Fill-570 Application software. When using TaskExpert custom programming, these Fill-570 specific fields will be unavailable for use by the TaskExpert custom program. The same restrictions exist for Shared Data specific to the Drive-570 (Chapter 10).

3.1.1. Application Dynamic Commands and Events (AC)

Access:	"All Users" Access		
Class Code:	0x70	Data Type:	D
Instances:	1		

3.1.1.1. Attributes

ac0100	Composite ac block	Struct	na	Composite of entire block
ac0101 to ac0199	Commands 1-99	BI	rc	Commands destined for the Application.

3.1.1.2. Methods

Applications may use this block of Shared Data for receiving Dynamic commands. One use is communicating command data with remote tasks over PLC or TCP/IP communications.

3.1.2. Application Floating Point Process Data (AF)

Access:	"Maintenance" Level Access		
Class Code:	0x7E	Data Type:	PP
Instances:	2		

3.1.2.1. Attributes

af--00	Composite of af block	Struct	na	Composite of entire block
af--01 to af--99	Floating Point Fields 1-99	D	rt	

3.1.3. Application Dynamic Integer Fields (AI)

Access:	"All Users" Access		
Class Code:	0x6E	Data Type:	D
Instances:	1		

3.1.3.1. Attributes

ai0100	Composite ai block	Struct	na	Composite of entire block
ai0101 to ai0199	Integer Fields 1-99	US	rt	Application may use these fields to exchange dynamic data

3.1.3.2. Methods

Applications may use this block of Shared Data for storing Dynamic integer fields. One use is exchanging integer data with remote tasks over PLC or TCP/IP communications.

3.1.4. Application Dynamic Floating Point Fields (AJ)

Access:	"All Users" Access		
Class Code:	0x6D	Data Type:	D
Instances:	1		

3.1.4.1. Attributes

aj0100	Composite aj block	Struct	na	Composite of entire block
aj0101 to aj0199	Floating Point Fields 1-99	D	rt	Application may use these fields to exchange dynamic data

3.1.4.2. Methods

Applications may use this block of Shared Data for storing Dynamic floating point fields. One use is exchanging floating point data with remote tasks over PLC or TCP/IP communications.

3.1.5. Application Dynamic String Fields (AK)

Access:	"All Users" Access		
Class Code:	0x6B	Data Type:	D
Instances:	1		

3.1.5.1. Attributes

ak0100	Composite ak block	Struct	na	Composite of entire block
ak0101 to ak0199	String Fields 1-99	S101	rt	Application may use these fields to exchange dynamic data

3.1.5.2. Methods

Applications may use this block of Shared Data for storing Dynamic string fields. One use is for exchanging string data with remote tasks over PLC or TCP/IP communications.

3.1.6. Application Dynamic Character Arrays (AL)

Access:	"All Users" Access		
Class Code:	0x6C	Data Type:	D
Instances:	1		

3.1.6.1. Attributes

al0100	Composite al block			Due to data storage limitations of the IND570 terminals, al0100 is not available for read as an entire block. Only the individual fields of this block can be accessed.
al0101 to al199	Character Array Fields 1-99	ABy50	rt	Application may use these fields to exchange dynamic data

3.1.6.2. Methods

Applications may use this block of Shared Data for storing Dynamic string fields. One use is exchanging an array of binary data with remote tasks over PLC or TCP/IP communications.

3.1.7. Application Virtual Console Messages (AM)

Access:	"All Users" Access		
Class Code:		Data Type:	D
Instances:	3	The Control Panel uses instance 1 Applications use instances 2 and 3.	

3.1.7.1. Attributes

am--00	Composite am block	Struct	na	Composite of entire block
am--01	Unicode LPRINT Message	S1000	na	
am--02	Trigger to Begin LPRINT	By	rc	Set to 1 to initiate LPRINT command
am--03	LPRINT Complete Status	By	rt	0 = print in progress 1 = LPRINT command complete 2 = LPRINT command failure.
am--04	LPRINT Debug Data Override	By	na	Set to 1 to begin data debug on LPRINT printer
am--05	Application Console Out Message	S200	rt	Application Output Messages for display on Virtual Console display
am--06	Application Console In Message	S100	rt	Application Console Messages that are input from a Virtual Console keyboard
am--07	Trigger to Begin Console Print	By	rc	Set to 1 to begin Console Print
am--08	Console Print Complete Status	By	rt	1 = Console Print complete

am--09	Keyboard Data Ready Trigger	By	rc	1 = Keyboard Data ready

3.1.7.2. Methods

An Application can use this structure to send and receive messages from a Virtual Console. The Virtual Console consists of input messages from a Virtual Console keyboard, a Virtual Console display, and a Virtual Console LPRINT device.

When LPRINT messages can span multiple blocks, the start of the print message must contain the <dprint> tag and the end of the message must contain the </dprint > tag. The Application begins the LPRINT by setting 1 in the "begin print" trigger. It must wait until it sees the print complete status before setting another LPRINT block into Shared Data.

3.1.8. Application Integer Process Data (AP)

Access: "Maintenance" Level Access.
Class Code: 0x7D Data Type: PP
Instances: 1

3.1.8.1. Attributes

ap0100	Composite ap block	Struct	na	Composite of entire block
ap0101 to ap0199	Integer Fields 1-99	US	rt	

3.1.9. Application Installation Information (AQ)

Access: "Supervisor" Access
Class Code: Data Type: PS
Instances: 20
Instances 1–12 - TaskExpert Applications
Instance 13 – TaskExpert Application called from Setup Tree
Instance 18 - Upgrade
Instance 19 - Resident Scale Task
Instance 20 - Control Panel

3.1.9.1. Attributes

aq--00	Composite aq block	Struct	na	Composite of entire block	
aq--01	Application Type	By	na	0 = None 1 = Control Panel	2 = Reserved 4 = Task Expert
aq--02	Application Name	S21	na	Application File Name	
aq--03	Part Number	S14	na		
aq--04	Software Number	S14	na		
aq--05	Setup Application Name	S30	na	CP displays this application name in Setup Tree/Menu	
aq--06	Security Code	S14	na	Each application must have a valid security code that authorizes its execution on the IND570	

aq--07	Enable Auto-Start	BI	na	1 = Enable Auto-Start of Application
aq--08	Enable Manual Start	BI	na	1 = Enable Manual-Start of Application from Softkey Manager
aq--09	Enable Manual Stop	BI	na	1 = Enable Manual-Stop of Application from Softkey Manager
aq--10	Enable Console for Application	By	na	1 = Enable Front Console for the Application
aq--11	Virtual Console Instance	By	na	0 = None, 1, 2, or 3. am--00 instance that is the Virtual Console for this application

3.1.9.2. Method

This block contains identification, security, and location information for each application pack or Task Expert application installed in the IND570. The IND570 will only start the applications identified in this list. Each application must have a valid security code.

Instance 1-3 are for Task Expert applications.

Instance 4 is the Custom Setup application for the Task Expert applications. The name of the application is TEsetup.cpt.

3.1.10. Application String Process Data (AR)

Access:	"All Users" Access		
Class Code:	0x7F	Data Type:	PP
Instances:	1		

3.1.10.1. Attributes

ar0100	Composite of ar block	Struct	na	Composite of entire block
ar0101 to ar0199	String 1-99	S101	rt	

3.1.11. Application Dynamic Statuses (AS)

Access:	"All Users" Access		
Class Code:	0x79	Data Type:	D
Instances:	1		

3.1.11.1. Attributes

as0100	Composite as block	Struct	na	Composite of entire block
as0101 to as0199	Statuses 1-99	By	rt	Statuses enabling Application to respond to Commands.

3.1.11.2. Methods

Applications may use this block of Shared Data for setting Dynamic statuses. One use is communicating status data with remote tasks over PLC or TCP/IP communications.

3.1.12. Application Message Table (AW)

Access:	"All Users" Access		
Class Code:	0x9C	Data Type:	PS
Instances:	1		

3.1.12.1. Attributes

aw0100	Composite aw block	Struct	na	Composite of entire block
aw0101 - aw0193	String setup fields 1 to 93	S101		
aw0194	Strings for email	S101	na	Message text for email "Information Alert"
aw0195				Message text for email "Warning Alert"
aw0196				Message text for email "Failure Alert"
aw0197				Message text for email "Automatic Service Alert"
aw0198				Field to capture specific operator text entered during manual service email.
aw0199				Message text for email "Email Test"

3.1.13. Application Integer Setup (AX)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

3.1.13.1. Attributes

ax0100	Composite ax block	Struct	na	Composite of entire block
ax0101 to ax0199	Integer Setup Fields 1-99	US	na	

3.1.14. Application Floating Point Setup (AY)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

3.1.14.1. Attributes

ay0100	Composite ay block	Struct	na	Composite of entire block
ay0101 to ay0199	Floating Point Fields 1-99	D	na	

3.1.15. Application String Field Setup (AZ)

Access:	"Maintenance" Level Access.
Class Code:	
Instances:	1

3.1.15.1. Attributes

az0100	Composite az block	Struct	na	Composite of entire block
az0101 to az0150	String Setup Fields 1-50	S101	na	

3.1.16. TaskExpert Application Start and Stop Triggers (AT)

Access:	"All Users"		
Class Code:	0x97	Data Type:	D
Instances:	20	1 instance for each application corresponding to the applications instances defined in AQ block	

3.1.16.1. Attributes

at--00	Composite at block	Struct	na	Composite of entire block
at--01	Start Application	BI	rc	1 = Start the application defined in the corresponding entry of the AQ block
at--02	Stop Application	BI	rc	1 = Stop corresponding AQ application
at--03	Pause/Suspend Application	BI	rc	1 = Pause/suspend corresponding AQ application
at--04	Resume Application	BI	rc	1 = Resume corresponding AQ application
at--05	Application Run Status	By	rc	0 = Application thread not running 1 = Application stopped 2 = Application running 3 = Application suspended

3.1.16.2. Methods

Setting trigger = 1 signals the corresponding application defined in the AQ block.

3.1.17. Task Expert Data Entry Unicode String Fields (TX)

Access:	"All Users"		
Class Code:		Data Type:	D
Instances:	1		

3.1.17.1. Attributes

tx0100	Composite tx block	Struct	na	Composite of entire block
tx0101-tx0150	Unicode String Fields 1-50	S40	rt	Task Expert Application uses these fields to retrieve operator-entered data.

tx0151	DataGrid Edited Field Data	S40	rt	DataGrid returns edited field data to Application
tx0152	DataGrid Edited Field Row ShortID$	S40	rt	DataGrid returns edited field row shortID$ to Application.
tx0153	DataGrid Edited Field Column Number	S40	rt	DataGrid returns edited field column number to application
tx0154	DataGrid Edited Field Row Index	S40	rt	DataGrid returns edited field row index to Application
tx0155	Task Expert Data Grid Response	S40	rt	The Task Expert application sets this field to "Accept" message to accept the edited data in the field. Otherwise, It sets the field to an Error message to reject the newly edited value.
tx0156	Current Focus Element	US	rt	Task Expert indicates the application object that currently has the focus. Task Expert writes this field whenever there is a change of focus for the application object.
tx0157	Lost Focus Element	US	rt	Task Expert indicates the application object that has just lost the focus. Task Expert writes this field whenever there is a change of focus for the application object.
tx0164	Datagrid Processing Error Status	US	rt	0 = OK 11 = Error Opening Database 12 = Error Writing to Database

3.1.17.2. Methods

Task Expert applications use these fields to retrieve data that the operator enters through the TEXTBOX, COMBOBOX, or DATAGRID objects displayed in the custom application window. The field attribute number corresponds to the object number coded in the TEXTBOX or COMBOBOX commands.

4 Target Data

4.1. Complex Target Data

4.1.1. Full Target Commands (SC)

Access:	"Supervisor" Level Access		
Class Code:	0x92	Data Type:	D
Instances:	1		

4.1.1.1. Attributes

sc0100	Composite sc block	Struct	na	Composite of entire block
sc0101	Start/Resume Target	BI	rc	Set from 0 to 1 to trigger a start. . If sp0121 is 1 (paused), sc0101 acts as a resume command.
sc0102	Pause/Abort Target	BI	rc	Set from 0 to 1 to trigger command. If sp0121 is 0 (running), sc0102 performs a pause. If sp0121 is 1 (paused), sc0102 performs an abort.
sc0103	Apply New Target Coincidence	BI	rc	This command only updates the active target weight value from Shared Data. It does not change any other active target fields.
sc0106	Pause Target	BI	rc	Set from 0 to1 trigger command. Operates only if target is running. Command puts target in pause state, turns off feed status, and turns on sp0121 pause status.
sc0107	Resume Target	BI	rc	Set from 0 to 1 to trigger command. This command works only from the pause state. It does not update the copy of the target from target shared data. It only resets the latch and enables the target.

4.1.2. Full Target Statuses (ST)

Access:	"Read Only" Access		
Class Code:	0x93	Data Type:	D
Instances:	1		

4.1.2.1. Attributes

st0100	Composite st block	Struct	na	Composite of entire block

st0102	Latched	Bl	rt	0 = No. 1 = Yes.
st0103	Feeding	Bl	rt	0 = No. 1 = In Progress
st0104	Fast Feeding	Bl	rt	0 = No. 1 = In Progress
st0105	Below Low Tolerance Weight	Bl	rt	0 = Over Low Tolerance Weight. 1 = Under Low Tolerance Weight.
st0106	Above High Tolerance Weight	Bl	rt	0 = Under High Tolerance Weight. 1 = Over High Tolerance Weight.
st0107	In Tolerance	Bl	rt	0 = Out of Tolerance. 1 = In Tolerance.
st0111	Pause	Bl	rt	0 = Running. 1 = Paused.

4.1.2.2. Method

Please read the method description in data block "SP" for the Full Target Process status.

Applications can read the status of the Full Target operation from here.

4.1.3. Full Target Process Data (SP)

Access: "Supervisor" Level Access.
sp0104 and sp0106 are Service level.
Class Code: 0x69 Data Type: PP
Instances: 1

4.1.3.1. Attributes

sp0100	Composite sp block	Struct	na	Composite of entire block
sp0101	Target Description	S21	na	Text name describing the Target
sp0102	Target is Active	By	na	0 = Target Disabled. 1 = Target Active.
sp0103	Shared Data Field Source	S7	na	Shared Data field for containing source value to be compared in Target.
sp0104	Target Data Stream Type	By	na	G = Gross = 71 (ASCII Decimal). N = Net = 78. A = Average weight in DYN-570 = 65
sp0105	Target Coincidence Value	D	rt	Weight value without units.
sp0106	Latching-Type Target	Bl	na	0=Non-latching type. 1= Latching-type. Applications must set this field to enable "latching". When latching is set, the Target will not re-enable the feed after the device first reaches Target and the Application resets the "latched" bit.
sp0107	Target Is Latched	Bl	na	If latching is set, the Target sets field to 1 when it first encounters the Target coincidence. The Application must reset this bit to 0 to start the next Target processing. Targets will power up in latched state once set.
sp0108	Over Under Target Action	By	na	6 = Over/Under mode motion check disabled. 9 = Over/Under mode motion check enabled.

sp0109	Spill Weight Value	D	rt	This is a cutoff Spill Value for a weight Target When this field is set, the Target turns off the feed or fine feed when: Weight = (sp0105) – (sp0109).
sp0110	Fine Feed Weight Value	D	rt	For two-speed feeds, this field is a Fine Feed (slower feed) value. When this field is set, the Target turns off the Fast Feed when: Weight = (sp0105) – (sp0109) – (s0110)
sp0111	Upper Tolerance Value	D	rt	The Target uses this field to determine if the ACTUAL cutoff weight falls within this specified upper tolerance. This is the last OK weight when transitioning from "in tolerance" to "over tolerance". Value is in absolute weight or deviation from Target depending on sp0113.
sp0112	Lower Tolerance Value	D	rt	The Target uses this field to determine if the actual cutoff weight falls within this specified lower tolerance. This is the first OK weight when transitioning from "under tolerance" to "in tolerance". Value is in absolute weight or deviation from target depending on sp0113.
sp0113	Set Tolerance Operation	By	na	0 = Weight Deviation from Target 1 = Absolute Weight Value. 2 = % Deviation from Target.
sp0114	Upper Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the upper tolerance value as a percent of the coincidence value.
sp0115	Lower Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the lower tolerance value as a percent of the coincidence value.
sp0120	Target Weight Units	By	na	0 = Primary units. 1 = Secondary units. 2 = Third units.
sp0121	Target Is Paused	By	na	0 = Running. 1 = Paused. RST sets field upon command from Application.
sp0122	Assigned Scale	By	na	Always 1. This field is copied to sp0102 when the Target is enabled.
sp0173	Target ID	US	na	Active ID number in Target Table.

4.1.3.2. Method

Fields in "sp" class are applicable with **Basic** terminal functionality. The Fill-570 uses different Shared Data.

4.2. Simple Target (Comparator) Data

4.2.1. Comparator Commands (SK)

Access:	"Supervisor" Level Access.
Class Code:	Data Type: D
Instances:	5

4.2.1.1. Attributes

sk--00	Composite sk block	Struct	na	Composite of entire block
sk--01	Reset Comparator	BI	rc	Set field to "1" to reset Comparator.
sk--03	Apply New Comparator Coincidence Value	BI	rc	Set field to "1" to apply new coincidence value written to sd--05.

4.2.2. Comparator Process Data (SD)

Access:	"Supervisor" Level Access. sp0104 and sp0106 are Service level.
Class Code:	Data Type: PP
Instances:	5

4.2.2.1. Attributes

sd--00	Composite sd block	Struct	na	Composite of entire block
sd--01	Comparator Description	S21	na	Text name describing the comparator (simple setpoint)
sd--02	Comparator is Active	By	na	RST sets = 1 when the Target is active, = 0 when Target is disabled.
sd--03	Shared Data Field for Comparator Source	S7	na	Points to a Shared Data source field to be compared to coincidence target: Displayed Weight & ABS-Displayed Weight = wt0111 Gross Weight = wt0110 Rate & ABS-Displayed Weight = wt0114
sd--05	Comparator Coincidence Value	D	na	Units must be the same as sd--03 Trigger change by setting corresponding sk--01instance to "1".
sd--08	Comparator Operator	By	na	1 = ' < ', 2 = ' <= ', 3 = ' = ', 4 = ' <> ', 5 = ' > ', 6 = ' >= '
sd--09	Second Weight Range Value	D	na	Used as a second target coincidence value in Weight Range mode; units must be the same as sd--03.
sd--10	Second Weight Comparison	By	na	1 = ' < ', 2 = ' <= ', 3 = ' = ', 4 = ' <> ', 5 = ' > ',

	Operator			6 = ′ >= ′
sd--30	Source for Comparator	By	na	0 = None 1 = Displayed Weight 2 = Gross Weight 3 = Rate 4 = Application 5 = ABS- Displayed Weight 6 = ABS - Rate

4.2.2.2. Method

In its simplest form, a Comparator is a Target having two numeric data inputs and one binary output. One of the two numeric data inputs is a Coincidence (or Target) Value, which an Application may update at any time. The other numeric data input is an available shared data stream. You may associate the logical output of a Comparator Target with a physical Discrete Output or may use as an internal status.

Binary Result = Source value <comparison operator> Coincidence Target value

5 Discrete I/O Data

5.1.1. Local Discrete Input/Output Status (DI)

Access:	Discrete output statuses have a "Supervisor" Level Access. Discrete input statuses have "Read Only" Access.
Class Code:	0x78 Data Type: D
Instances:	1

5.1.1.1. Attributes:

di0100	Composite di block	Struct	na	Composite of entire block
di0101	Input Status 1	Bl	rt	0 = Off, 1 = On.
di0102	Input Status 2	Bl	rt	0 = Off, 1 = On.
di0103	Input Status 3	Bl	rt	0 = Off, 1 = On.
di0104	Input Status 4	Bl	rt	0 = Off, 1 = On.
di0105	Output Status 1	Bl	rt	0 = Off, 1 = On.
di0106	Output Status 2	Bl	rt	0 = Off, 1 = On.
di0107	Output Status 3	Bl	rt	0 = Off, 1 = On.
di0108	Output Status 4	Bl	rt	0 = Off, 1 = On.
di0109	Output Status 5	Bl	rt	0 = Off, 1 = On.
di0110	Output Status 6	Bl	rt	0 = Off, 1 = On.
di0111	Output Status 7	Bl	rt	0 = Off, 1 = On.
di0112	Output Status 8	Bl	rt	0 = Off, 1 = On.
di0113	Input Status 5	Bl	rt	0 = Off, 1 = On.

5.1.1.2. Method:

The IND570 has up to five Discrete Inputs and eight Discrete Outputs on its optional, internal Discrete I/O boards.

The Application can read or write the Discrete Output Statuses. It can only read the Discrete Input Statuses.

The Application or Ladder Logic can read or write these status bits to read or write the corresponding physical discrete inputs and outputs.

5.1.2. Discrete Input Edges (DE)

Access:	"Supervisor" default level, customizable by individual field.		
Class Code:	de	Data Type:	D
Instances:	1		

5.1.2.1. Attributes:

de0100	Composite de block	Struct	na	Composite of entire block
de0101	Rising Input Edge 1	BI	rc	1 = Transition from 0 to 1 detected
de0102	Rising Input Edge 2	BI	rc	1 = Transition from 0 to 1 detected
de0103	Rising Input Edge 3	BI	rc	1 = Transition from 0 to 1 detected
de0104	Rising Input Edge 4	BI	rc	1 = Transition from 0 to 1 detected
de0105	Falling Input Edge 1	BI	rc	1 = Transition from 1 to 0 detected
de0106	Falling Input Edge 2	BI	rc	1 = Transition from 1 to 0 detected
de0107	Falling Input Edge 3	BI	rc	1 = Transition from 1 to 0 detected
de0108	Falling Input Edge 4	BI	rc	1 = Transition from 1 to 0 detected
de0109	Rising Input Edge 5	BI	rc	1 = Transition from 0 to 1 detected
de0110	Falling Input Edge 5	BI	rc	1 = Transition from 1 to 0 detected

5.1.2.2. Method:

The Resident Scale Task sets the associated command to 1 when it detects a rising or falling edge on a discrete input. The Application can trigger this change of state. After receiving the trigger, the Application must reset the command to 0 in order to be able to receive the next trigger.

When edge-triggered inputs are used in a ladder, they can be automatically cleared. Refer to details in the LL block description, in section 5.1.5, below.

5.1.3. Remote Discrete Input Edges (RE)

Access:	"Supervisor" default level, customizable by individual field.		
Class Code:	re	Data Type:	D
Instances:	3	There are up to 3 Remote I/O "nodes."	

5.1.3.1. Attributes:

de--00	Composite de block	Struct	na	Composite of entire block
de--01	Rising Input Edge 1 - 4	BI	rc	1 = Transition from 0 to 1 detected
de--04				
de--05	Falling Input Edge 1 - 4	BI	rc	1 = Transition from 0 to 1 detected
de--08				

5.1.3.2. Method:

The Resident Scale Task sets the associated command to 1 when it detects a rising or falling edge on a discrete input. The Application can trigger this change of state. After receiving the trigger, the Application must reset the command to 0 in order to be able to receive the next trigger.

When edge-triggered inputs are used in a ladder, they can be automatically cleared. Refer to details in the LL block description, in section 5.1.5, below.

5.1.4. Remote Discrete Input/Output Status (RI)

Access:	Discrete outputs have a "Supervisor" Level Access. Discrete inputs have "Read Only" Access.		
Class Code:	0x95	Data Type:	D
Instances:	3	There are up to 3 Remote I/O "nodes."	

5.1.4.1. Attributes:

ri--00	Composite ri block	Struct	na	Composite of entire block
ri--01 to ri--04	Input Status 1-4	BI	rt	0 = Off, 1 = On.
ri--05 to ri--10	Output Status 1 - 6	BI	rt	0 = Off, 1 = On.
ri--21	Remote Unit Status	By	rt	0 = Not active, 1 = Status OK, 2 = Error condition

5.1.4.2. Method:

The ARM100 Remote Discrete I/O Unit attaches to the IND570 through a Serial port. There can be up to 3 ARM100 nodes. Each node has 4 Discrete Inputs and 6 Discrete Outputs. The IND570 monitors the state of the Remote Discrete I/O using a unique Serial I/O protocol that talks to the Remote I/O unit.

The Resident Scale Task records the state of the physical discrete inputs and outputs in Shared Data. The Application can read the individual statuses. The Application can read or write the Discrete Output Statuses. It can only read the Discrete Input Statuses.

5.1.5. Internal Ladder Logic Program Setup (LL)

Access:	"Maintenance" Level Access		
Class Code:		Data Type:	PS
Instances:	1		

5.1.5.1. Attributes:

II0100	Composite II block	Struct	na	Composite of entire block
II0101	Number of Ladder Rungs	By	na	Number of rungs in the ladder program
II0102 to II0199	Ladder Logic Rungs 1-98	S32	na	Each attribute is a Ladder Logic Rung

5.1.5.2. Method

The IND570 has a simple Ladder Logic Interpreter that runs in the background monitor continuously Discrete I/O and Shared Data commands. The Ladder Logic Program executes these tasks efficiently to minimize CPU utilization and to respond quickly to "real-time" changes in Discrete I/O or Shared Data commands.

The Ladder Logic Interpreter runs in conjunction with Visual Basic or Task Expert Programs. Visual Basic and Task Expert are the custom application programming languages for the IND570. They handle sophisticated application tasks and operator interfaces. The Ladder Logic Interpreter efficiently handles the very simple, repetitive task of monitoring Discrete IO and Shared Data commands. Using the Interpreter, you eliminate the significant processing overhead and logic in custom Visual Basic applications required to accomplish these repetitive tasks. Visual Basic applications and the Ladder Logic programs communicate to each other through Shared Data.

The Control Panel Setup and other Application programs must build the Ladder Logic program for their application. The Ladder Logic commands provide flexibility for different applications to select what signals the Interpreter monitors and how it acts on the signals. The Ladder Logic Interpreter loads the program code from this Shared Data block. Each attribute is a Ladder Logic Rung.

5.1.5.2.1. Ladder Rung Commands

There are six rung commands. Each rung takes one or two inputs, and has one output. The rung inputs and outputs are physical Discrete IO or Shared Data commands.

RUNGAND input1, input2, output takes two inputs, "AND's" them together, and outputs the result. For example, take a physical discrete input "permissive" signal and "AND" it with "Target 1 feeding" to generate a physical discrete output.

```
RUNGAND ri0101,st0103,di0105
```

RUNGANDNT input1, input2, output takes two inputs, "AND's" them together, and outputs the inverse value. For example, take two physical inputs and generate a physical discrete output.

```
RUNGANDNT di0101,di0102,di0105
```

RUNGMOV input, output takes an input and generates an output with the same value. For example, take a tare when a physical discrete input goes on.

```
RUNGMOV di0103,wc0201
```

RUNGMVNOT input, output moves the inverse of the input to the output. For example, turn on a physical discrete output when the data from the scale is invalid.

```
RUNGMVNOT wx0138,di0108
```

RUNGOR input1, input2, output takes two inputs, OR's them together, and outputs the result. For example, turn on a physical discrete output if the scale is in motion.

```
RUNGOR wx0131,wx0231,di0508
```

RUNGORNOT input1, input2, output takes two inputs, OR's them together, and outputs the inverse value. For example, turn on a physical discrete output when either the custom application turns off an application status or a physical discrete input is off.

RUNGORNOT as0101,di0103,di0505

The IND570 defines commands as one byte hex value as referenced in the table below:

Command	Hex Value
RUNGAND	0x61
RUNGANDNT	0x67
RUNGMOV	0x65
RUNGMVNOT	0x75
RUNGOR	0x62
RUNGORNOT	0x72

6 Database and Table Data

6.1.1. Database Table Description (DD)

Access:	"All Users" Access		
Class Code:		Data Type:	PP
Instances:	10	One entry for each of the A0 – A9 Standard tables. 2 = Table A1 = Tare Table 3 = Table A2 = Target Table	

6.1.1.1. Attributes

dd--00	Composite dd block			

6.1.1.1.1. Active Record

dd--01	Entry number of current record	S8	na	Column 1 - Entry number of the current database record
dd--02	Alphanumeric Key	S16	na	Column 2 - Alphanumeric Key
dd--03	Description field of current record	S40	na	Column 3 - Description field of the current record
dd--04	Data 1 field of current record	S16	na	Column 4
dd--05	Data 2 field of current record	S16	na	Column 5
dd--06	Data 3 field of current record	S16	na	Column 6
dd--07	Data 4 field of current record	S16	na	Column 7
dd--08	Data 5 field of current record	S16	na	Column 8
dd--09	Data 6 field of current record	S16	na	Column 9
dd--10	Data 7 field of current record	S16	na	Column 10
dd--11	Data 8 field of current record	S16	na	Column 11
dd--12	Data 9 field of current record	S40	na	Column 12
dd--13	Data 10 field of current record	S40	na	Column 13
dd--14	Data 11 field of current record	S40	na	Column 14
dd--15	Data 12 field of current record	S40	na	Column 15

6.1.1.1.2. Database Usage

dd--32	Database Table Usage	By	na	0=None, 1=Target Table, 2=Tare Table
dd--34	# of Columns in Database Table	By	na	Number of Columns used in table

6.1.1.1.3. Report Format

dd--41	Table Descriptive Name	S40	na	Descriptive Name for the table, such as, CUSTOMER, PRODUCT, TARGET, or TARE TOTALIZATION
dd--42	Report Header Print Template	By	na	Template Number 0 = None, 1 -10
dd--43	Report Body Print Template	By	na	Template Number 0 = None, 1 -10
dd--44	Report Footer Print Template	By	na	Template Number 0 = None, 1 -10

6.1.1.1.4. Statistics

dd--51	Number of Entries in Table	US	na	
dd--52	Number of Reads from Table	UL	na	Running read count
dd--53	Number of Writes to Table	UL	na	Running write count
dd--54	Average Read Access Time	US	na	In milliseconds
dd--55	Average Write Access Time	US	na	In milliseconds
dd--56	Last Read Access Time	AL2	na	In 100 nanosecond intervals since 1601

6.1.1.1.5. Column Names

dd--61	Name for Column 1	S16	na	Corresponds to dd--01 entry
dd--62	Name for Column 2	S16	na	Corresponds to dd--02 entry
dd--63	Name for Column 3	S16	na	Corresponds to dd--03 entry
dd--64	Name for Column 4	S16	na	Corresponds to dd--04 entry
dd--65	Name for Column 5	S16	na	Corresponds to dd--05 entry
dd--66	Name for Column 6	S16	na	Corresponds to dd--06 entry
dd--67	Name for Column 7	S16	na	Corresponds to dd--07 entry
dd--68	Name for Column 8	S16	na	Corresponds to dd--08 entry
dd--69	Name for Column 9	S16	na	Corresponds to dd--09 entry
dd--70	Name for Column 10	S16	na	Corresponds to dd--10 entry
dd--71	Name for Column 11	S16	na	Corresponds to dd--11 entry
dd--72	Name for Column 12	S16	na	Corresponds to dd--12 entry
dd--73	Name for Column 13	S16	na	Corresponds to dd--13 entry
dd--74	Name for Column 14	S16	na	Corresponds to dd--14 entry
dd--75	Name for Column 15	S16	na	Corresponds to dd--15 entry
dd--77	Data Type for Column 4	S16	na	dd--04 entry type % = Integer # = Float $ = Character (default)
dd--78	Data Type for Column 5	S16	na	dd--05 entry type
dd--79	Data Type for Column 6	S16	na	dd--06 entry type

dd--80	Data Type for Column 7	S16	na	dd--07 entry type
dd--81	Data Type for Column 8	S16	na	dd--08 entry type
dd--82	Data Type for Column 9	S16	na	dd--09 entry type
dd--83	Data Type for Column 10	S16	na	dd--10 entry type
dd--84	Data Type for Column 11	S16	na	dd--11 entry type
dd--85	Data Type for Column 12	S16	na	dd--12 entry type
dd--86	Data Type for Column 13	S16	na	dd--13 entry type
dd--87	Data Type for Column 14	S16	na	dd--14 entry type
dd--88	Data Type for Column 15	S16	na	dd--15 entry type

6.1.1.2. Method

An Application can use the Miscellaneous fields in this block to maintain Database Table records. The Application can set these fields in a print template for printing by the RST.

6.1.1.2.1. A1 - Tare Table

SD Field	DB Field	Name	Type	Len	Description
dd0201	Record number				
dd0202	Alphanumeric Key	ID	A/N	16	Tare ID
dd0203	Description	Description	A/N	40	Tare Description
dd0204	Data1	Tare	N		Tare Value
dd0205	Data2	Unit	N		Weighing Unit (see td0125 for unit designations)
dd0206	Data3	n	N		Total Count
dd0206	Data4	Total	N		Total Weight

6.1.1.2.2. A2 - Target Table

SD Field	DB Field	Name	Type	Len	Description
dd0301	Record number				
dd0302	Alphanumeric Key	ID	A/N	16	Target ID
dd0303	Description	Description	A/N	40	Target Description
dd0304	Data1	target	N		Target value
dd0305	Data2	Units	A/N		Target Units (see td0125 for unit designations)
dd0306	Data3	spill	N		Spill value
dd0307	Data4	aTol	N		Positive Tolerance
dd03008	Data5	sTol	N		Negative Tolerance
dd0309	Data6	fine	N		Fine Feed

6.1.2. Database (Table) Setup (DS)

Access:	"Maintenance" Level Access
Class Code:	Data Type: PS
Instances:	1

6.1.2.1. Attributes

ds0100	Composite ds block	Struct	na	Composite of entire block

6.1.2.1.1. Target Table Settings

ds0111	Target Comparison Mode	By	na	0 = None, 1 = Material Transfer, 2 = Over/Under
ds0112	Target Output Mode	By	na	0 = Concurrent Target Outputs (feed and fast feed are on together) 1 = Independent Target Outputs (feed and fast feed are on separately)
ds0113	Target Tolerance Entry	By	na	The operator enters Target tolerance values: 0 = Weight Deviation from Target. 1 = Absolute Weight Value, 2 = % Deviation from Target
ds0114	Target Description In Report	Bl	na	0 = Disabled. 1 = Enabled
ds0115	Target Value In Report	Bl	na	0 = Disabled. 1 = Enabled
ds0116	Target Tolerances In Report	Bl	na	0 = Disabled. 1 = Enabled
ds0117	Target Spill Value In Report	Bl	na	0 = Disabled. 1 = Enabled
ds0118	Target Fine Feed Value In Report	Bl	na	0 = Disabled. 1 = Enabled
ds0119	Target Totalization Weight	By	na	0 = None, 1 = Gross Weight, 2 = Net (Displayed) Weight

6.1.2.1.2. Tare Totalization Table Settings

ds0121	Tare Totalization Weight	By	na	0 = None 1 = Gross Weight 2 = Net (Displayed) Weight
ds0122	Tare Description Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ds0124	Tare Value In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0125	Tare Description In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0126	Tare "n" Value In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0127	Tare Totalization In Report	Bl	na	0 = Disabled. 1 = Enabled.

6.1.2.2. Method

The Control Panel uses the Target Settings for building a table of Targets.

The Control Panel uses the Global Tare Totalization Settings for building a Tare Settings Table. The Formatted Output Server (FOS) in the Resident Scale Task adds the weight for each completed transaction to the Tare Totalization totals.

6.1.3. Temporary Database Table Description (TD)

Access:	"All Users" Access		
Class Code:		Data Type:	PP
Instances:	1	One entry for each scale.	

6.1.3.1. Attributes:

td0100	Composite td block				

Active Tare Table Record

td0102	Active Tare Record ID	S16	na	Alphanumeric Key	
td0103	Description	S40	na	Description field of active Tare Table record	
td0104	Value	S16	na	Tare value of active Tare Table record	
td0105	Units	S16	na	1 = lb 2 = kg 3 = g 5 = t	7 = ozt 8= dwt 9 = oz 11 = ton
td0106	"n" Value	S16	na	n = number of transaction accumulated in active Tare Table record	
td0107	Total	S16	na	Accumulated weight of "n" number of transaction of active Tare Table record	

Active Target Table Record

td0122	Active Target Table ID	S16	na	ID of active Target Table record	
td0123	Description	S40	na	Description field of active Target Table record	
td0124	Target	S16	na	Target value of active Target Table record	
td0125	Units	S16	na	1 = lb 2 = kg 3 = g 5 = t	7 = ozt 8= dwt 9 = oz 11 = ton
td0126	Spill	S16	na	Spill value (if applicable) of active Target Table record	
td0127	Lower Tolerance	S16	na	Lower tolerance value of active Target Table record	
td0128	Upper Tolerance	S16	na	Upper tolerance value of active Target Table record	
td0129	Fine Feed	S16	na	Fine Feed value (if applicable) of active Target Table record	

Miscellaneous Table Record

td0142	Active Misc Table Record ID	S16	na	ID of active Miscellaneous Table record

td0143	Description	S40	na	Description field of active Miscellaneous Table record
td0144	Data field #1 of Current Misc Record	S16	na	Data field description for active table record
td0145	Data field #2 of Current Misc Record	S16	na	Data field description for active table record
td0146	Data field #3 of Current Misc Record	S16	na	Data field description for active table record
td0147	Data field #4 of Current Misc Record	S16	na	Data field description for active table record
td0148	Data field #5 of Current Misc Record	S16	na	Data field description for active table record
td0149	Data field #6 of Current Misc Record	S16	na	Data field description for active table record
td0150	Data field #7 of Current Misc Record	S16	na	Data field description for active table record
td0151	Data field #8 of Current Misc Record	S16	na	Data field description for active table record
td0152	Data field #9 of Current Misc Record	S40	na	Data field description for active table record
td0153	Data field #10 of Current Misc Record	S40	na	Data field description for active table record
td0154	Data field #11 of Current Misc Record	S40	na	Data field description for active table record
td0155	Data field #12 of Current Misc Record	S40	na	Data field description for active table record

6.1.3.2. Method:

These shared data fields will report values only if the active Tare or Target record was retrieved directly from the Tare or Target Table. If manual changes are made to the active Tare or Target record, these shared data values will report empty fields.

The shared data fields for Active Tare and Active Target are only applicable for standard functionality Over/Under or Material Transfer modes of operation. They do not work for the Fill-570 Application Software.

7 Communication and PLC Data

7.1. Web and Network Data

7.1.1. Web Page Process Data (HT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PP
Instances:	1		

7.1.1.1. Attributes

ht0100	Composite ht block	Struct	na	Composite of entire block
ht0130	Shared Data Server Save Area	AL110	na	Saves Shared Data Socket Server callbacks and group settings

7.1.2. Network Node Status (NS)

Access:	"Read Only" Access		
Class Code:	0x6F	Data Type:	D
Instances:	1		

7.1.2.1. Attributes

ns0100	Composite ns block	Struct	na	Composite of entire block
ns0124	PLC Online	BI	rt	0 = No. 1 = Yes.

7.1.3. Data Connections Setup (DC)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	20		

7.1.3.1. Attributes

dc--00	Composite dc block	Struct	na	Composite of entire block	
dc--01	Output Connection Type	By	na	0 = None 5 = Demand Print 6 = Continuous Output	8 = Reports 9 = Action Log output 10 = Continuous short

				7 = Continuous Template	30 = Totals reports
dc—02	Input Connection Type	By	na	0 = None 1 = CTPZ 2 = SICS Slave Level 0 & 1 3 = ASCII Input 5 = Remote I/O 6 = COM-570 8530	7 = COM-570 PT6S3 8 = COM-570 SMA 9 = COM-570 8142 10 = COM-570 Command Template 14 = Shared Data Server
dc—04	Output Trigger	By	na	Entity that triggers output: 0 = None 1 = Scale 6–8 = Custom Print Trigger 1 – 3	
dc—05	Print Template(s)	ABI 11	na	An array which indicates what print template is being used on the connection: Example: 0 0 0 0 1 0 0 0 0 0 0 = Connection uses Template 4	
dc—06	Address	By	na	Address for COM-570 8142/8530 Host '2' - '9'.	
dc—07	I/O Port	ABy 3	na	There are up to 3 I/O ports for an output data connection. There can be only one local I/O port connection for an input connection. The I/O port numbers are as follows: 1-3 = Serial Ports 1-3 14-15 = Ethernet TCP/IP Ports 2-3 16 = Ethernet TCP/IP Port 1 17 = EPrint Port	
dc—08	Add Checksum	BI	na	1 = Add checksum to end of output string	

7.1.3.2. Method

You can establish Data Connections to Serial Ports and TCP/IP (Ethernet) Connection Ports. There is a separate instance of the DC class for each data connection. You may only specify a single output type OR a single input type in each connection instance – not both. An SICS command connection is an exception; it is both and input and an output connection.

Here are some rules for configuring data connections:

- Demand Print and Continuous Print connections CANNOT share the same I/O port.
- An input connection CANNOT share the same I/O port with another input connection.
- Multiple demand print and custom print connections CAN share the same I/O port.
- Demand OR Continuous Print connections CAN share an I/O port with a single Input-only connection, such as CTPZ-command connection or a bar-code reader connection.
- A SICS-connection must have exclusive use of its I/O port since it does bi-directional I/O.
- Scales and Remote Discrete I/O devices must have exclusive use of their I/O port.

- Custom applications must have exclusive use of their I/O ports for communicating bi-directionally with a custom device. However, they CAN share a port with demand print and custom print connections when the Application is doing output-only operations.
- Only the first LPRINT connection definition is valid.

The RST uses the "Output Trigger" parameter for determining which device or command can trigger the print operations for the connection. Shared Data commands for each device initiate the demand or continuous print operations. Shared Data commands trigger the custom print operations.

The **TCP/IP Console Print Server** enables one or more remote client programs to receive print data from the IND570. The remote clients can be WINDOWS PC Visual Basic applications or other TCP/IP host programs. You must first enable the TCP/IP Console Print Server Print Connection. Then, whenever a remote client establishes a TCP/IP connection, the Console Print Server sends the LPRINT data, the Demand and Custom print data, and the Console Log data to the client across the TCP/IP connection to the remote client. The Console Print Server uses TCP/IP port 1701 for establishing connections.

The IND570 Console Print Server sends only the specific output selected by the Output Connection and LPRINT device parameters in the TCP/IP data connection instances.

In order to route print connection data to a remote IND570 terminal I/O port, you must setup an output connection to a TCP/IP port locally. In the remote IND570 terminal, you must configure a "Network Print Client" to fetch the data and route it to the proper I/O port.

The TCP/IP Console Print Server routes input data that it receives as keystrokes to the Softkey Manager/ Keyboard Routing. Then, using this connection, a remote client can submit keystrokes to the IND570.

Each Demand print, Custom print, or LPRINT message have a <dprint> and </dprint> delimiter tags to denote the beginning and end of the message, and they may span multiple messages. The Print Client and destination Serial Services task must print the data within the beginning and ending tags sequentially and consecutively so that messages from different terminals do not become intermixed.

7.1.4. Email Alert Setup (NA)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.1.4.1. Attributes

na0100	Composite na block	Struct	na	Composite of entire block
na0102	SMTP Server IP Address	S40	na	
na0103	SMTP User Name	S21	na	
na0104	SMTP Sender E-mail Address	S40	na	
na0108 to	E-mail Recipient Address 1-6	S40	na	

na0113				
na0114 to na0119	Email Levels/Type Active per User	ABy 6	na	Array Structure: Information - Warning - Failure – Service 48 = Email level/type disabled 49 = Email level/type enabled
na0127	SMTP Password	S13	na	

7.1.5. FTP Server Setup (NF)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.1.5.1. Attributes

nf0100	Composite nf block	Struct	na	Composite of entire block
nf0101	Enable FTP Server	BI	na	0 = FTP disabled completely 1 = FTP enabled. Read all data and write data based on the user's level of FTP access rights (default) 2 = FTP enabled. Read all data but no write access - regardless of the user's level of FTP access rights.
nf0102 to nf0107	FTP Login Names 1- 6	S13	na	nf0102 = admin (read only) nf0103 = anonymous (default)
nf0108 to nf0113	FTP Passwords 1-6	S13	na	********
nf0114 to nf0119	Write Access Level for Logins 1-6	By	na	1=Operator, 2=Supervisor, 3=Service, 4=Administrator nf0114 = Administrator (read only) nf0115 = Operator (default)

7.1.5.2. Method

The FTP Server listens on a TCP/IP port for a remote FTP client to initiate a connection with the FTP Server. Once the Client and Server establish the connection, the FTP client initiates the file transfers to and from the Server, using standard FTP Protocol commands.

7.1.6. Network Print Client Setup (NP)

Access:	"Service" Level Access is default. Customizable by individual field.		
Class Code:	np	Data Type:	PS
Instances:	1		

7.1.6.1. Attributes

np0100	Composite np block	Struct	na	Composite of entire block
np0101	Enable Network Print Client	BI	na	0 = No. 1 = Yes

np0105	Network Print Client Port Number	S21	na	
np0106	Network Print Client IP Address	S40	na	
np0109	Reserved	BI	na	

7.1.7. TCP/IP/Ethernet Network Setup (NT)

Access:	"Maintenance" Level Access. nt0101 is read only, nt0113 and nt0114 are "admin" level
Class Code:	Data Type: PS
Instances:	1

7.1.7.1. Attributes

nt0100	Composite nt block	Struct	na	Composite of entire block
nt0101	Ethernet MAC Address	S13	na	Read from Ethernet Adapter.
nt0102	Ethernet IP Address	S40	na	Default: 192.168.0.1 Used only when IP address is fixed – when DHCP is not being used.
nt0103	Ethernet IP Address Subnet Mask	S40	na	Default: 255.255.255.000
nt0104	Ethernet Gateway IP Address	S40	na	Default: 000.000.000.000
nt0105	Enable Ethernet DHCP Client	By	na	0 = No. 1 = Yes
nt0107	Ethernet Name	S40	na	Default is IND570
nt0113	Shared Data Server Access	By	na	0 = Disable, 1 = Read/Write (default), 2 = Read Only
nt0114	Web Server Access	By	na	0 = Disable, 1 = Read/Write (default), 2 = Read Only
nt0115	Automatic DNS Server Addressing	By	na	0 = Disable, 1 = Enable
nt0116	Preferred DNS Server	S40	na	IP Address
nt0117	Alternate DNS Server	S40	na	IP Address
nt0118	Enable Proxy Server	By	na	0 = Disable, 1 = HTTP, 2 = Socks v5
nt0119	Proxy Server Address	S40	na	Domain name or IP address
nt0120	Proxy Port	US	na	Default: 8080
nt0121	Proxy User Name	S13	na	Proxy server user name
nt0122	Proxy Password	S13	na	Proxy server passport

7.1.8. Serial Port Setup (RP)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	6

7.1.8.1. Attributes

rp--00	Composite rp block	Struct	na	Composite of entire block		
rp--01	Interface Type	By	na	0 = RS232. 1 = RS422 . 2 = RS485		
rp--02	Baud Rate	By	na	0 = 300	4 = 4800	8 = 57,600
				1 = 300	5 = 9600	9 = 115,200
				2 = 1200	6 = 19,200	
				3 = 2400	7 = 38,400	
rp--03	Parity	By	na	0 = None. 1 = Odd. 2 = Even.		
rp--04	Flow Control	By	na	0 = None. 1 = Xon/Xoff.		
rp--05	Data Bits	By	na	1 = 7 bits, 2 = 8 bits		
rp--06	Stop Bits	By	na	1 or 2		
rp--08	Assignment for Port	By	rt	0 = None 2 = Remote Discrete I/O (ARM100) 3 = Data Connection 4 = Application		
rp--09	Assigned Use of COM4 and COM5	By	na	Used for the IND570x COM4 and COM5 port setup. 0 = None 3 = Standard 5 = ACM500		

7.2. Print and Templates Data

7.2.1. Demand Print Setup (DP)

Access:	"Maintenance" Level Access dp0102 is Administrator Level Access
Class Code:	Data Type: PS
Instances:	1

7.2.1.1. Attributes

dp0100	Composite dp block	Struct	na	Composite of entire block
dp0101	Enable Auto-Print	BI	na	0 = Disabled. 1=Enabled.
dp0102	Ensure No Motion Before Printing	BI	na	0 = No. 1 = Yes.

dp0103	Print Threshold	D	na	Weight threshold for Auto-Print and Scale Weighment Monitoring. Set in primary weight units.
dp0104	Print Reset Threshold	D	na	Weight threshold for resetting Auto-Print and Scale Weighment Monitoring. Set in primary weight units.
dp0105	Minimum Weight Print Threshold	D	na	Minimum print threshold for demand print.
dp0107	Print Interlock Enabled	BI	na	1 = Enabled; 0 = Disabled
dp0108	Weight Deviation Print Threshold	D	na	Auto-Print when this absolute weight deviation occurs from the last printed weight.

7.2.1.2. Method

The Demand Print command is a "transaction" print command. A local operator, an external operator, or a remote device can generate a print command. When the Resident Scale Task receives a Print command, it formats and stores weight and other data as a transaction record for the scale. It forwards the transaction record to one or more destinations, which could include a printer, Alibi (transaction) memory, or a remote device.

The Resident Scale Task rejects Print command when:

- The scale weight is less than the Minimum Print Weight.
- The scale is in motion and dp0102 is enabled.
- After generating a print, the Resident Scale Task has not reset the print trigger because the weight has not gone below the print reset threshold, when auto-print is enabled in dp0101.

Auto-Print is Demand Print command that operates in conjunction with the Print Threshold and the Reset Print Threshold. When the scale weight goes above the Print Threshold and there is no motion the scale, the Resident Scale Task automatically generates a demand print. When the scale goes below the Print Reset Threshold, the Resident Scale Task re-enables or re-sets for the next print.

Print Connections Table associates a logical print command with one or more physical print devices and print messages. The Print Template Setup specifies the format of the print messages.

Scale Monitoring uses these settings to count the number and size of the scale's weighments.

The Weights and Measures seal protects the print configuration.

7.2.2. Custom Print Trigger Commands & Statuses (CP)

Access:	"All Users" Access		
Class Code:	0x94	Data Type:	D
Instances:	1		

7.2.2.1. Attributes

cp0100	Composite cp block	Struct	na	Composite of entire block
cp0101	Custom Print Trigger 1-3	BI	rc	Set from 0 to 1to start custom print.
cp0102				
cp0103				
cp0104	Blend/Fill Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0105	Cycle Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0106	Dose Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0107	Dump Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0111	Custom Print Trigger 1–3 status	By	rt	Command Completion Statuses 0 = Success. 1-255 = Specific error code.
cp0112				
cp0113				

7.2.2.2. Method

The Application uses this Shared Data block to activate custom triggers and to monitor their completion status.

7.2.3. Print Templates Setup (PT)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	1

7.2.3.1. Attributes

pt0100	Composite pt block	Struct	na	Composite of entire block
pt0101 to pt0110	Print Templates 1–10	S1001	na	Printer Template – Refer to Appendix B in IND570 Technical Manual for Default Template formats.
pt0111 to pt0130	Print Literals 1-20	S51	na	Fixed Text Messages used in Templates

7.2.3.2. Method

Templates are a method to configure both data content and data format in print messages. A Template is a user specific "program" that the RST Template Interpreter executes to build a print message. A Template defines a serial data stream that the IND570 transmits to a printer, sends to a host computer, or writes to a data file. The IND570 supports template nesting. Templates make use of the encapsulation of related data fields. For example, weight data is not composed of 10 isolated fields, but is instead a single object having many highly correlated attributes, such as gross, tare, net, units, and tare mode. These attributes remain internally consistent at all times.

The Weights and Measures seal does not protect Template editing.

A Template Editor that runs in the IND570 Control Panel or in a remote PC Setup program enables the user to build the Template.

Appendix B in the **IND570 Technical Manual** describes the Default Template formats.

7.2.4. Report Print Templates Setup (RT)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	1

7.2.4.1. Attributes

rt0100	Composite rt block			
rt0101	Report Width	BI	na	0 = Wide (80characters) 1 = Narrow (40 characters)
rt0102	Blank Header Lines	By	na	# of blank lines in header.
rt0103	Print Standard Title	BI	na	0 = No 1 = Yes
rt0104	Record Separation	By	na	0 = None, 1 = *, 2 = -, 3 = =, 4 = CR/LF
rt0105	Blank Footer Lines	By	na	# of blank lines in footer.

7.2.4.2. Method

RST uses the Report Template settings for printing the Standard Terminal reports.

7.2.5. Command Input Setup (MS)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	8 (Only 1 instance for ms0103 - ms0106.) Specific to COM-570 customizable Command Template feature

7.2.5.1. Attributes

ms--00	Composite ms block	Struct	na	Composite of entire block.
ms--01	Function Type	By	na	0 = None, 1 = Clear, 2 = Preset Tare, 3 = Print, 4 = Switch Units, 5 = Switch Unit 1, 6 = Switch Unit 2, 7 = Tare, 8 = Zero
ms--02	Character	ABy7	na	Up to 7 characters (numbers, letters and any special characters) can be entered for any command (Clear, Tare, Print, Zero, Switch Units, Primary Unit, Second Unit, Preset Tare). Preset Tare: can be added after the Preset Tare to creat a custom format.
ms0103	Prefix1	By	na	
ms0104	Prefix2	By	na	

ms0105	Terminator1	By	na	
ms0106	Terminator2	By	na	
ms--07	Character	ABy7	na	Up to 7 characters (numbers, letters and any special characters) can be entered for Preset Tare command. Can be added before Preset Tare to create a custom format.

7.3. Prompt (ID Mode) Data

7.3.1. ID1-4 Setup (PR)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	4		

7.3.1.1. Attributes

pr--00	Composite pr block	Struct	na	Composite of entire block
pr--01 – pr--30	Setup of individual ID steps	Aby6	na	ID step setup array: First byte is setup number, value is 1-30. Second byte is type, value is 0-6: 0 = Alphanumeric 1 = Clear Tare 2 = Numeric 3 = Print 4 = Tare – Auto 5 = Tare – Preset 6 = Selection List (only available for pr01--) Third byte is Clear Data, value is 0-1: 0 = Disabled 1 = Enabled Fourth byte is length, or number of selections in list, when bit 2 = 6 Fifth and sixth bytes are Reserved.
pr--81	Prompt Mode	By	na	0 = None, 1 = Automatic (only available for pr01--), 2 = Softkey
pr--82	Prompt Looping	By	na	0 = Disabled, 1 = Enabled
pr--83	Prompt Threshold	D	na	Entered value
pr--84	Prompt Reset Threshold	D	na	Entered value

7.3.2. ID Selection List (SL)

Access:	"Service" default level is customizable by individual field
Class Code:	sl Data Type:
Instances:	4

7.3.2.1. Attributes

sl--00	Composite sl block	Struct	na	Composite of entire block
sl--01	Prompt string 1-6			
sl--02				
sl--03				
sl--04				
sl--05				
sl--06				

When the second byte of pr--01 (ID step setup array) is set to 6 (Selection List), the sl block defines the content of a list of up to 6 items.

7.3.3. Prompt Response (PA)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PP
Instances:	4

7.3.3.1. Attributes

pa--00	Composite pa block	Struct	na	Composite of entire block
pa--01 - pa--30	Prompt string 1-30	S51	na	Corresponding entries to Prompts as defined in the "pr" block.

When Selection Box is used, the selection will be shown as a text string.

7.4. Analog Output Data

7.4.1. Analog Output Setup (AO)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	1

7.4.1.1. Attributes

ao0100	Composite ao block	Struct	na	Composite of entire block
ao0101	Data Source	By	na	1 = Gross Weight 2 = Net Weight

				3 = Rate 4 = Application 5 = ABS – Displayed Weight 6 = ABS - Rate
ao0102	Source Device	By	na	Always 1 (Scale)
ao0103	Zero Preset	D	na	Value = Zero on Analog Output
ao0104	Span Preset	D	na	Value = Span on Analog Output
ao0105	Zero Adjustment	D	na	Manual Adjustment to Zero
ao0106	Span Adjustment	D	na	Manual Adjustment to Span
ao0107	Output range/type selection	By	na	0 = 4-20 mA, 1 = 0-10V

7.4.1.2. Method

The Analog Output logic always reports weight in primary units.

7.5. PLC Data

7.5.1. PLC Setup (PL)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.5.1.1. Attributes

pl0100	Composite pl block	Struct	na	Composite of entire block	
pl0101	PLC Node Address	By	na	Allen-Bradley 0-59 Profibus station ID 1-127	DeviceNet station ID 0-63 Ethernet/IP MacID 1-99
pl0102	PLC Type	By	na	0 = None 2 = Profibus 3 = Ethernet/IP The RST automatically determines the PLC Type by reading the installed hardware board	4 = Device Net 5 = AB RIO 6 = Analog Out
pl0103	Number of Message Slots Used	By	na	Slots used in PLC Message – up to 4	
pl0106	Data Format	By	na	1 = Integer Weight 2 = Integer Increments	4 = Floating Point 6 = Application Processing
pl0107	Enable Explicit Messaging	BI	na	0 = Disabled. 1 = Enabled. AB RIO Block Transfer supports the ability to read and write Shared Data. For Profibus, this field enables reading and writing of Shared Data IO blocks appended to cyclic data messages. Ethernet/IP contains explicit messaging as a	

				part of its standard protocol.	
pl0109	DHCP Client Enable	Bl	na	Default = 1, enable	
pl0110	Data Rate	By	na	AB RIO: 0 = 57.6K 1 = 115.2K 2 = 230.4K	DeviceNet: 0 = 125K 1 = 250K 2 = 500K
pl0111	AB RIO Starting Quarter	By	na	1 – 4	
pl0112	AB RIO Last Rack	Bl	na	1 = Yes 0 = No	
pl0113	Byte-Ordering of PLC Data	By	na	0 = Word Swap 1 = Byte Swap 2 = Historic 3 = Double Word Swap	
pl0115	Size of Application Cyclic Input to PLC	US	na	In "Application Processing" Data Format mode (Task Expert), the Application must set the exact size of the input assemblies.	
pl0116	Size of Application Cyclic Input from PLC	US	na	In "Application Processing" Data Format mode (Task Expert), the Application must set the exact size of the output assemblies.	
pl0120	Rotation	S10	na	Restore user configuration about slot 1 rotation.	
pl0121	Rotation	S10	na	Restore user configuration about slot 2 rotation.	
pl0122	Rotation	S10	na	Restore user configuration about slot 3 rotation.	
pl0123	Rotation	S10	na	Restore user configuration about slot 4 rotation.	
pl0125	Ethernet/IP IP Address	S40	Na	IP Address for Ethernet/IP	
pl0126	Ethernet/IP Subnet Mask	S40	Na	Subnet Mask for Ethernet/IP	
pl0127	Ethernet/IP Global Address	S40	Na	Subnet Mask for Global Address	
pl0128	DeviceNet or ControlNet Option Node Address	By	na	DeviceNet station ID 0-63 ControlNet station ID 0-99	
pl0129	AB RIO Address Display Format	By	na	0 = Display in Decimal format 1 = Display in Octal format	
pl0134	Operating mode	By	na	Data format mode 0 = Compatible with IND780 and IND131/331 (default) 1 = Emulation mode – match existing IND560 mode	

7.5.1.2. Method

The IND570 RST supports three general methods for building PLC output messages and processing PLC Input Messages:

1. The RST uses Internally-Defined PLC input and output messages. These messages have a fixed format. The RST builds the output messages and processes the input messages based on this fixed format.

2. The Application processes the PLC messages. The RST sends the Output-to-PLC messages from the Dynamic PLC IO Shared Data Block (PI). It writes the Input-from-PLC messages to the same block and alerts the Application that there is a new message.

7.5.1.2.1. PLC Data Byte-Ordering – pl0113

		Word Swap	Byte Swap	Historic	Double Word Swap
	Terminal Weight Value	1355	1355	1355	1355
	PLC	15 Bits 0	15 Bits 0	15 Bits 0	15 Bits 0
Integer	Weight value word	0x054B Hex	0x4B05 Hex	0x054B Hex	0x4B05 Hex
Floating Point	1st Weight value word	0x6000 Hex	0xA944 Hex	0x44A9 Hex	0x0060 Hex
	2nd Weight value word	0x44A9 Hex	0x0060 Hex	0x6000 Hex	0xA944 Hex

Rotation is only supported in Floating Point mode. The following AB RIO and Profibus commands create the correct strings of "Y"s and "N"s to set up the desired rotations.

- Command 03 (PLC RESET ROTATION) will fill PLC rotation SDV (Either pl0120 or pl 0121 for AB RIO. pl0121, pl0122, pl0123 or pl0124 for Profibus) with "NNNNNNNNN"
- Command 40 will fill 'Y' to the first byte
- Command 41 will fill 'Y' to the second byte
- Command 42 will fill 'Y' to the third byte
- Command 43 will fill 'Y' to the 4th byte
- Command 44 will fill 'Y' to the 5th byte
- Command 45 will fill 'Y' to the 6th byte
- Command 46 will fill 'Y' to the 7th byte
- Command 47 will fill 'Y' to the 8th byte
- Command 48 will fill 'Y' to the 9th byte

7.5.2. Dynamic PLC IO Data (PD)

Access: "All Users"
Class Code: Data Type: D
Instances: 1

7.5.2.1. Attributes

pd0100	Composite pd block	Struct	na	Composite of entire block
pd0101	Application Cyclic Input to PLC Buffer	ABy500	rt	Task Expert Application sets Cyclic Input to PLC buffer.
pd0102	Application Cyclic Input to	US	rt	Task Expert Application sets input buffer length. RST

	PLC Length			transfers data length from setting in pl0115.
pd0103	Application Cyclic Output from PLC Buffer	ABy500	rt	RST sets Cyclic Output data from PLC in buffer for Task Expert application.
pd0104	Application Cyclic Output from PLC Length	US	rt	RST sets data length for pl0116.
pd0105	Application Explicit Out from PLC Buffer	ABy500	rt	RST sets Explicit Output sent from PLC in in this buffer for Task Expert application. This capability is available for explicit messaging and for ABRIO Block Transfer messaging only.
pd0106	Application Explicit Out from PLC Length	US	rt	RST sets length of Explicit Output data length for Task Expert Application.
pd0107	Application Explicit Input to PLC Buffer	ABy500	rt	Task Expert Application sets the Explicit Input buffer to send to PLC. The RST sends to PLC upon read request by PLC. This capability is available for explicit messaging and for ABRIO Block Transfer messaging only.
pd0108	Application Explicit Input from PLC Length	US	rt	Task Expert Application set this field to indicate length of data in the Explicit Input to PLC buffer.
pd0110	Application Send Cyclic Output Command	Bl	rc	Application sets from 0 to 1 to send new cyclic data to PLC.
pd0112	Received New Cyclic Input Status	Bl	rc	RST sets from 0 to 1 to alert application for new data cyclic received.
pd0114	Analog Output Value	D	rt	Application uses this value to control Analog Output values.
pd0116	Analog Out Error Signal	Bl	rt	Application uses this value to control Analog Output Discrete Error.
pd0118	Display Data Output from PLC	S20	rt	RST sets this when PLC command sends new display data.
pd0119	PLC Display Command Byte	By	rt	0 = Clear Display Message 1 = Display Message Table message 1 (aw0101) 2 = Display Message Table message 2 (aw0102) 3 = Display Message Table message 3 (aw0103) 4 = Display Message Table message 4 (aw0104) 5 = Display Message Table message 5 (aw0105) 6 = Start ID1 prompt sequence 7 = Display text in pd0118 8 = Start ID2 prompt sequence.

7.5.2.2. Method

The IND570 allows the Application to directly control the PLC Messaging. This option can be selected in Setup. Other options allow the Resident Scale Task to process the PLC messages. When controlling the PLC messaging, the Application must be keenly aware of the capabilities and limitations of the particular PLC protocol.

The Application uses the "pd" block to affect its direct control over the PLC message data. Using this block, the Application can directly access the PLC message data. This block also has triggers that the Resident Scale Task and Application use to signal each other when another buffer is ready.

The Resident Scale Task maintains "cyclic" and "explicit" message buffers for both input and output messages. Cyclic messages are scheduled messages that occur on a periodic basis, for example, once every 50 milliseconds. All PLC protocols support cyclic messaging. Cyclic messages typically contain dynamic data, such as weight data or weight status, which is continuously changing.

Explicit messages are unscheduled messages that occur on demand by the PLC. They are typically request-response message exchanges that the PLC initiates. In a good system design, they should occur much less frequently than the cyclic messages. One good use for explicit messages in IND570 systems is in reading and writing Shared Data. For example, explicit messages can set a Target coincidence value. Not all PLC protocols support the concept of explicit messages; in which case, the Application must embed the explicit message capability inside the cyclic messaging.

The IND570 allows the Application to control directly the Analog Output signal level. This option can be selected in theSetup menu tree. Other options allow the Resident Scale Task to control the signal level. When in control, the Application writes to Shared Data fields in the pd block to control the signal.

7.6. Barcode Data

7.6.1. ASCII Input Message (MB)

Access:	"All Users" Access		
Class Code:		Data Type:	D
Instances:	1		

7.6.1.1. Attributes

mb0100	Composite mb block	Struct	na	Composite of entire block
mb0101	ASCII Input Message	S100	na	Resident Serial Services decomposes the message into message blocks according to the Input Message Template
mb0102	Clear Message Block	BI	rc	The Application must set this to 1 when it is done processing the current message.
mb0103	New Message Received	BI	rt	Trigger to Application indicating that a new input message is ready for the Application to begin processing. Set trigger to 1 to initiate.

7.6.1.2. Method

Resident Serial Services parses a ASCII/ (barcode) Input string based on the message definition in the ASCII (barcode) Template (bt) Setup fields, and stores the parsed message in the Shared Data Message Block. The Data Connections (dc) Setup fields assign the bt input message to a Serial port.

The Serial Services buffers serial port input data. The Serial Services copies the next message from its buffer into the mb0101 Shared Data field, and sets the mb0103 trigger to alert the Application

that a new message is ready. When the Application has completed processing the current message block, it must set the mb0102 trigger to the clear the message block. Then, the Serial Services can again copy the next message from its buffer to the message block.

7.6.2. ASCII Input Templates Setup (BT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.6.2.1. Attributes

bt0100	Composite bt block	Struct	na	Composite of entire block	
bt0101	Preamble Length	By	Na	Length of data ignored at beginning of message.	
bt0102	Max Data Length	By	na	Maximum input data length.	
bt0103	Postamble Length	By	na	Length of data ignored at end of message before the termination character.	
bt0104	Termination Character	By	na	Terminate input whenever this character is encountered.	
bt0105	Input Template Assignment	By	na	0 = Application 1 = Tare value 2 = Tare ID 3 = Target ID	4 = ID 1 5 = Keypad 6 = Target Weigh-in 7 = Target Weigh-out

7.6.2.2. Method

Resident Serial Services parses an ASCII Input string based on the message definition in the ASCII (barcode) Template (BT) Setup fields and stores the message in the Shared Data Message Block. The Data Connections (DC) Setup fields assign the BT template processing to a Serial or USB input port.

8 Other Data

8.1. Display and Keyboard Data

8.1.1. Power-Up Weight Display (XA)

Access:	"Maintenance" Level Access
Class Code:	Data Type: PS
Instances:	1

8.1.1.1. Attributes

xa0100	Composite xa block	Struct	na	Composite of entire block	
xa0101	Set Weight Display Visible	By	rt	1 = Set Visible (default). 2 = Set Invisible	
xa0102	Set SmartTrac™ Display Visible	By	rt	1 = Set Visible. 2 = Set Invisible (default).	
xa0111	Weight Display Height	By	rt	0 = None 1 = Small (17 dots/6.1mm)	2 = Medium (37 dots/11.2mm) 3 = Large (74 dots/16.9mm)
xa0114	Rate Display	By	rt	1 = Set visible. 0 = Set invisible.	
xa0116	SmartTrac™ Height	By	rt	0 = None 1 = Small	2 =Medium (default) 3 = Large
xa0119	DIO status	By	rt	DIO status to be shown on the home page. 1 = Set Visible (default), 2 = Set Invisible	
xa0120	Metrology Line	By	rt	1 = Set Visible (default, Cap/d), 2 = Set Invisible, 3 = Set Visible (Max/Min/e)	

8.1.1.2. Method

This block contains power-up settings for the weight and SmartTrac™ display. Changes only take effect on power-up. To have the Application change weight display appearance dynamically, use the XB block.

When Rate display (xa0116), SmartTrac (xa0116) and DIO status (xa0119) are set as visible, only SmartTrac is visible on screen. The order of priority is: SmartTrac, Rate display, DIO status.

8.1.2. Dynamic Weight Display Commands (XB)

Access:	"All Users" Access
Class Code:	Data Type: D
Instances:	1

8.1.2.1. Attributes

xb0100	Composite xb block	Struct	na	Composite of entire block	
xb0101	Set Weight Display Visible	By	rt	0 = Use Default in xa0101 1 = Set Visible	2 = Set Invisible
xb0102	Set SmartTrac™ Display Visible	By	rt	0 = Use Default in xa0102 1 = Set Visible	2 = Set Invisible
xb0111	Set Weight Display Height	By	rt	0 = Use default in xa0111 1 = Small (17 dots/6.1mm)	2 = Medium (37 dots/11.2mm) 3 = Large (74 dots/16.9mm)
xb0114	Rate Display	By	rt	0 = Use default in xa0114, 1 = Visible, 2 = Invisible	
xb0115	Set SmartTrac™ Type	By	rt	0 = Use default per target type 3 = Three Zones	1 = Bar graph
xb0116	Set SmartTrac™ Height	By	rt	0 = Use default in xa0116 1 = Small	2 = Medium 3 = Large
xb0117	Target Driving SmartTrac™ Display	By	rt	0 = Use default in xa0117	
xb0119	DIO Status	By	rt	0 = Use default in xa0119, 1 = Visible, 2 = Invisible	
xb0120	Set Metrology Line Visible TE	By	rt	0 = Use default in xa0120 2 = Set invisible	1 = Set visible (default, Cap/d) 3 = Set Visible (Max/Min/e)

8.1.2.2. Method

The Control Panel or custom Application can set this block to set parameters for the display.

8.1.3. Dynamic Display Positions (XY)

Access: "All Users" Access

Class Code: Data Type: D

Instances: 7
- Instance 1 = System Message Display
- Instance 2 = Digital Weight and SmartTrac™ Visualization Display
- Instance 3 = Softkey Display
- Instance 4 = Control Panel Display
- Instance 5 = Reserved
- Instance 6 = Reserved
- Instance 7 = Task Expert Display

8.1.3.1. Attributes

xy--00	Composite xy block	Struct	na	Composite of entire block
xy--01	Visible	BI	rt	0 = No. 1 = Yes
xy--02	Starting X coordinate	US	rt	Starting horizontal pixel position for the display area. Allowed values = 1-256.
xy--03	Starting Y coordinate	US	rt	Starting vertical pixel position for the display area. Allowed

				values = 1-128.
xy--04	Width	US	rt	Actual viewable horizontal width of display in pixels.
xy--05	Height	US	rt	Actual viewable vertical height of display in pixels. Allowed values = 0-40. Does not shrink or enlarge display. Determines # of visible lines.

8.1.3.2. Method

Tasks associated with each instance of the display area must maintain the position data describing their display windows. Other tasks use this data to configure their own display positions and window sizes.

- The System Message/Error task maintains Instance 1
- The Weight Display and SmartTrac Visualization task maintains Instance 2
- The Control Panel maintains Instance 4
- The Softkey Manager maintains 3
- Instance 5 and 6 are reserved
- The Task Expert Language Interpreter maintains Instance 7

8.1.4. Keyboard Routing Commands (KC)

Access:	"Operator" default level		
Class Code:		Data Type:	D
Instances:	1		

8.1.4.1. Attributes

kc0100	Composite kc block	Struct	na	Composite of entire block

Keyboard Routing Tables

kc0110	Route Keypad Numeric Keys to Selection	By	rt	1 = Control Panel 3 = Disabled 4 = Task Expert
kc0111	Route Keyboard AlphaNumerics to Selection	By	rt	1 = Control Panel 3 = Disabled 4 = Task Expert
kc0112	Route Enter Key to Selection	By	rt	
kc0113	Route Navigation Keys to Selection	By	rt	
kc0114	Route Scale Keys to Selection	By	rt	
kc0115	Route Clear Key to Selection	By	rt	
kc0116	Route Function Keys to Selection	By	rt	

Softkey Processing Commands

kc0119	Disable Softkey Display	By	rt	Command from Application to Softkey Manager to disable and turn-off Softkey display.
kc0120	Go to Home Softkey page	By	rc	Command from Application to Softkey Manager = Reset Softkey Stack, display Home page, and begin processing it.
kc0124	Replace current top page	By	rc	Command from Application to Softkey Manager = Replace the current top page with the working page and begin to processing the new top.
kc0125	Current top page	By	na	Softkey Manager maintains this field with the index of the current top page on page stack.
kc0126	Current processing page	By	na	Softkey Manager maintains this field with the index of the page on the stack it is currently processing – either the home page or the current top page.
kc0127	Enable KeyPad Alphabetic Mode	By	rt	Command from Application to Softkey Manager. 0 = Interpret Softkeys as function keys 1 = Interpret Softkeys as alphabetic keys
kc0128	Enable Clear as Backspace Erase	By	rt	Command from Application to Softkey Manager: 0 = Interpret Clear Key as Clear Tare 1 = Interpret Clear Key as Backspace Erase key

Data Entry Line Commands

kc0130	Enable Data Entry Line	By	rt	Command from Application to Softkey Manager. 0 = Disable 1 = Enable with prompt in pre-entry mode 2 = Enable with no prompt in pre-entry mode 3 = Enable with prompt in specific entry mode 4 = Enable with no prompt in specific entry mode
kc0131	Font for Data Entry Line	By	rc	Font size * 2 (+1 for Bold)
kc0132	Pre-Entry Prompt for Data Entry	S21	rt	The application can specify a prompt message that Softkey manager displays at the beginning of the data entry line in pre-entry mode.
kc0133	Specific Prompt for Data Entry	S21	rt	The message that Softkey manager displays at the beginning of the data entry line in specific-entry mode.
kc0134	Format for a Specific Data Entry	S8	rt	The application can specify a numeric data format with a maximum number of digits and position of the decimal point. The format is "#nn.dd" where nn is the max number of numeric digits and dd is the decimal point position. Or the application can specify an alphanumeric data format with a maximum number of characters for alphanumeric data. The format is "!ss" where ss is the maximum number of alphanumeric characters.
kc0135	Format for Pre-Entry Data	S8	rt	The application can specify a numeric data or alphanumeric data format for data the operator enters in "pre-entry" mode. The format is the same as kc0134.
kc0136	Data Entry Line Data	S40	rt	The Softkey Manager records data here that the operator

				entered on the data entry line. The last character of the buffer contains the termination character.

8.1.4.2. Method

The Softkey Manager sends a custom message containing the Softkeys to the Message Window of the appropriate application. Each application must write its Message Window handle to Shared Data in order to receive the messages. Before an application terminates, it must clear its Message Window handle.

Other fields are commands from the applications to the Softkey Manager to control processing of the Softkey pages.

8.1.5. Static Home Softkey Page (KH)

Access:	"Maintenance" default level		
Class Code:		Data Type:	PS
Instances:	1		

8.1.5.1. Attributes

kh01000	Composite kh block	Struct	na	Composite of entire block
kh0105	Sofkey 1	S50	rt	See description in "kp" block
kh0106-0118	Softkeys 2-14	S50	rt	See description in "kp" block
kh0119	Softkey 15	S50	rt	See description in "kp" block

8.1.5.2. Method

The Softkey Manager uses this Static Home Page from permanently stored flash memory to initialize the Dynamic Softkey Home Page, kp0100, to begin processing the softkeys. The Control Panel application configures the Home Page.

8.1.6. Dynamic Softkey Page Stack (KP)

Access:	"Operator" default level		
Class Code:		Data Type:	D
Instances:	8	Instance 1 is the home page Instance 2 is the current page Instance 3-7 are Reserved Instance 8 is the Application working page	

8.1.6.1. Attributes

kp--00	composite kp block	Struct	na	Composite of entire block
kp--05	Softkey 1	S50	rt	A multi-part string containing: "Application Index, Softkey Identifier, Text Message Index, Graphics file name, program name", where • Application index points to the application that processes the key. <100 = Softkey index processes by Control Panel. If this Index is used, there is no Softkey Identifieror Graphics file name 100 = Task Expert Application. The Softkey Manager sends the key to the Task Expert Window. • The Application must define an integer "Softkey Identifier" for each softkey in the softkey stack. The Softkey Manager (SKM) sends this identifier in each softkey message that it sends to a destination application when the operator selects this softkey. • Graphics file name is a bit-map file used to draw the icon for the softkey. A NULL String entry in this field indicates that there is no "application key" or "softkey" associated with this entry.
kp--06-18	Softkeys 2-14	S50	rt	
kp--19	Softkey 15	S50	rt	

8.1.6.2. Method

The Softkey Manager uses the Dynamic Softkey page stack to manage the display and to control the processing of the IND570 softkeys. Each page instance represents all the softkeys used at one time. The Softkey Manager displays the keys within an instance in the order the Application writes them to Shared Data.

You can design your application to run so that the Softkey Manager only processes the Home Page and the Current Page – not the stack. For example, every Application Form loads a new Softkey image each time a new Application Form loads. The Application Form writes its Softkey image to the working image. Then, it issues the command kc0124 to replace the current page with the working page. After Form A starts Form B, Form A "closes" itself so that it is reloaded each time it restarts.

Custom TaskExpert Applications can rewrite the Dynamic Home Page to insert or remove their own softkeys. When the IND570 first starts up, the Softkey Manager initializes the Dynamic Home Page, kp0100, from the Static Home Page, kh0100, defined in Setup. The custom Application reas the Dynamic Home Page, inserts its own softkeys in any order into the Softkey page, and re-writes the Dynamic Home Page into Shared Data. The Softkey Manager rewrites the Softkey image on the display from the Dynamic Home Page. A custom Application must never modify the Static Home Page

8.1.6.2.1. Basic Functionality Home Position Softkeys

- All Softkey graphic files are .bmp type bitmap files.

Function	Index	Graphic File
Adjust Contrast	1	contrast
Alibi	2	alibi
Calibration Test	3	cal_test
Recall Info	4	recall
Reports	5	reports
Setup	6	setup
SmartTrac	7	Sm_trac
Tare Table	8	tare_mem
Target	9	target
Target Control	10	control
Target Table	11	targ_mem
Target Start	12	start
Time & Date	13	timedate
Unit Switching	14	select
X10 Display	15	x10
ID	19	id

Function	Index	Graphic File
MinWeigh	31	minweigh
Comparators	39	comprtr
Trigger 1	40	trigger1
Trigger 2	41	trigger2
Trigger 3	42	trigger3
Task list	38	tasklist
Repeat Print	43	rpt_prnt
Dynamic Start	44	inMot
Dynamic Test	45	Dyn_test
Task 1	46	task1
Task 2	47	task2
Task 3	48	Task3
Reset Trans. Cntr	49	reset.
Permanent ID (specific to Drive570)	201	permid
Temporary ID (specific to Drive570)	202	tempID

8.1.6.2.2. Fill-570 Home Position Softkeys

Function	Index	Graphic File
Container Tare	16	cntnr_tr
Cycles	17	cycles
Formula	18	formula
Weigh-in Start	20	weigh_in
Weigh-out Start	21	weighout
Container Tare Table	35	cntnr_m
Target Weigh-in	33	targ_in
Target Weigh-out	34	targ_out

8.2. System Status and Setup Data

8.2.1. System State (XD)

Access:	"Read Only" Access. xd0153 has "Administrator" Level Access.
Class Code:	0x65 Data Type: D
Instances:	1

8.2.1.1. Attributes

xd0100	Composite xd block	Struct	na	Composite of entire block	
xd0103	Current Date	S12	na	Format defined in xs0110	
xd0104	Time of Day	S12	na	Format defined in xs0111	
xd0107	Second Ticks	UL	rt	Number of seconds since power-up.	
xd0112	Clear System Message Display	By	rt	Set to 1 to clear current system display message in xd0153	
xd0115	Consolidated Weight String	S135	rt	Consolidated weight stream.	
xd0127	Last InTouch error	S13		Error Code: description. Refer to section 8.2.1.3, below	
xd0128	InTouch online/offline	By		0 = Offline, 1 = Online	
xd0131	System Setup State	By	rt	0 = Normal Run State. 1 = Setup State.	
xd0139	Mainboard Switch settings	By	na	Settings of the 2 toggle switches on the baseboard.	
				None = 0 Switch 2-2 = 2 Switch 1-1 = 4 Switch 1-1 & 1-2 = 12	Switch 2-1 = 1 Switch 2-1 & 2-2 = 3 Switch 1-2 = 8
xd0142	Flash memory capacity	UL	na	In bytes of Flash2	
xd0143	Amount of free flash memory	UL	na	In bytes of Flash2	
xd0151	Read Hardware Key Image	ABy48	na	Pac Hardware Key (iButton EEPROM) Read Image	
xd0153	Current System Message Display	S21	rt	A system line message will be written over and over, indefinitely, until xd0153 is written as a blank by the Application. In order to write a message to the System Message line, the Application should first read this field to make sure it is clear and then write the new message.	
xd0157	Firmware checksum	UL	rt	Firmware checksum	
xd0162	Remote Discrete I/O Network Status	By	rt	0 = No communication errors. 1 = Communication errors	
xd0163	iButton Target Product	By	rt		
xd0170	TE checksum	S81	rt		

xd0176	External flash memory capacity	UL	na	In megabytes of USB memory
xd0177	Free external flash memory	UL	Na	In megabytes of USB memory
xd0178	System error alarm	BI	rt	I/O assignment to system error
xd0179	System OK	BI	rt	I/O assignment to system OK
xd0181	Compile date and time	S21	na	e.g. "Jun 22 2015 11:45:09"
xd0182	Availability of USB memory	By	na	0 = Not plugged in, 1 = Ready
xd0183	Availability of Bar Code scanner/keyboard	By	na	0 = Not plugged in, 1 = Ready
xd0184	Result of firmware update	By	na	The result of updating firmware from USB memory in test mode: 0 = No result (default), 1 = Success, 2 = Failure
xd0185	Excitation voltage status	By	rt	0 = OK, 1 = Low
xd0186	Melsi status	By	rt	0 = OK, 1 = Error

8.2.1.2. Methods

This block shows the current state of the IND570 system.

The IND570 only updates date and time fields when an Application or RST attempts to access these fields. The IND570 updates the clock tick fields regularly so an Application may use these fields for periodic callbacks. xs0110 and xs0111 contain the format specification for the date and time.

The Consolidated Weight Stream (CWS) is a string that contains the weight on the scale on the IND570 terminal.

- Within this field, the weight is metrologically consistent among gross, net, and tare weights. We cannot guarantee this when the Application does individual reads because they occur at different times.
- It is more efficient to get all the data in one access instead of multiple accesses.
- An Application can access the CWS either locally or remotely.

The IND570 sets data in the CWS according to field xp0102, where the Application subscribes to the fields it wants reported. The format of xp0102 is S<ABCDE>T where ABCDE represents the scales, S represents the selected scale and T is the Time. "S" is mutually exclusive from ABCDE.

The Consolidated Weight Stream has the following format: stream <1><US><stream 2><US><stream n>, and it may contain time, display, and Application messages inserted in the output stream, with <US> separating the fields. Each weight stream has the following contents:

<Node ID>	1N	Range: 1 to 20 IND570 is fixed at 1
<Scale ID>	1A	Range: A to E. If selected scale, range is in lower case <a to e>. It is always A in the IND570.

<Status>	1C	Bit 7	Always 0
		Bit 6	Always 1
		Bit 5	1 = Scale in Motion
		Bit 4	1 = Center of Zero
		Bit 3-2	00 = Single Range
			01 = Weight Range 1
			02 = Weight Range 2
			03 = Weight Range 3
		Bit 1	1 = Net Mode
		Bit 0	1 = Preset Tare
<Units>	1N	0=None 1=lb 2=kg 3=g 4=t 5=ton 6=toz 7=dwt 8=oz 9=custom	
<Net Wt>	10N	8 digits plus possible "-" and "."	
		"^^^^^^^^^^" indicates the gross weight on scale is over capacity.	
		"vvvvvvvvv" indicates the gross weight is less than zero.	
		"----------" indicates an indeterminate weight.	
<Tare Wt>	10N	8 digits plus possible "-" and "."	

8.2.1.3. InTouch Error Codes, xd0127

0	No error	2	Internal error
3	Invalid argument	4	Out of memory
5	Already exists	6	Network general error
7	Network socket timeout	8	Blocked by network
9	Network unknown host	10	Network connection lost
11	Network connection refused	12	Network connection reset
13	Network connection abort	14	Network not connected
15	Web bad response	16	Web authentication failed
17	Web authentication unsupported	18	SSL general error
19	SSL weaker cipher	20	SSL certification issuer unknown
21	SSL certification invalid	22	SSL verify failed
23	SSL handshake failed	24	SOCKS wrong version
25	SOCKS authentication failed	26	SOCKS general server failure
27	SOCKS connection not allowed by rule set	28	SOCKS network unreachable
29	SOCKS host unreachable	30	SOCKS connection refused
31	SOCKS TTL expired	32	SOCKS command not supported
33	SOCKS address type not supported	34	Network net unreachable

35	Network host unreach	36	Network bad URL

8.2.2. System Logs Setup Data (XR)

Access:	"Maintenance" Level Access xr0203, xr0303, xr0403, and xr0503 are "Administrator" level.	
Class Code:		Data Type: PS
Instances:	75	Instance 1 = Maintenance Log Instance 2 = Alibi Memory or Action Log (Action Log = Fill-570 only) Instance 5 = Change Log Instance 6 = GWP Log Instance 7 = Error Log Note: Only instances 1, 2, 3, 6 and 7 can be enabled/disabled.

8.2.2.1. Attributes

xr--00	Composite xr block	Struct	na	Composite of entire block
xr--01	Number of Bytes in Log File	UL	na	Number of Bytes in Log File
xr--03	Enable logging	BI	rt	Is file logging enabled or not? 0 = No. 1 = Yes For xr0203, 0 = No, 1 = Alibi Memory enabled, 2 = Action Log enabled.

8.2.2.2. Method

The IND570 maintains 75 log files in Compact Flash. The Service Technician can use FTP to transmit each of these files to a host PC. These files can also be copied to USB memory. The log files are circular log files. The Log Files are circular files where the IND570 re-writes the oldest record first. However, The IND570 does not overwrite the oldest record in the Change Log until the user clears the log.

The **Maintenance Log** is a *circular log file* that contains a record of the significant processing events that may affect the "health" of the scale system. It aids the Service Technician in resolving problems and in deciding what service he needs to perform on the IND570. The Service Technician can select the items recorded in the log. The "Scale Monitoring Setup" block (cm) in Shared Data holds these selections.

The **Alibi Memory Log** is *circular log file* that contains a historical record of all the transactions performed on the IND570. The Demand Print operation defines a transaction on the IND570; the Demand Print Setup block specifies the requirements for legal Demand Print operations. Each Alibi Memory record has a fixed format field containing the date, time, scale identifier, net weight, tare weight, tare source, and consecutive number for each transaction. The user may specify a special Print Template for additional data that the IND570 adds to each record.

Alternatively, the **Action Log** can be enabled in setup that will log the time and date of certain actions and a text string explaining what the action was. The time and date information should be the fixed "time stamp" format. If enabled, this log file will use the file space normally available to the Alibi memory. It is not possible to have both Alibi memory and Action log at the same time. This log file should operate the same as Alibi memory in that it creates a small file in battery-backed

RAM and then transfers the data to flash when the file reaches a certain size. This file should be called Act_Log.csv and it should be available as a comma delimited file through the shared data server (serial interface) or FTP (Ethernet interface). The IND570 supports a 16000-event action log.

The **Change Log** is a *circular log file* that contains a complete record of the changes made to Shared Data Setup and Calibration fields. It provides an audit trail of all the changes that the Service Technician has made to the IND570 since its initial installation. This historical record is a requirement in the pharmaceutical and food industries, where companies must prove their compliance with governmental regulations. The IND570 provides warnings to the operator when this file is becoming full and disables itself when this file is finally full. Then, the Service Technician must use FTP to save the log file to a remote PC and reset the file before the IND570 will continue.

The **GWP Log** is a **circular log file** that contains the results of Sensitivity, Eccentricity Test and Repeatability Test. The records include **Date**, **Time**, **User ID**, **GWP Test** and **Status**.

8.2.3. System Log Process Data (XM)

Access:	"Read Only" Access.	
Class Code:	Data Type:	PP
Instances:	5	Instance 1 = Maintenance Log Instance 2 = Alibi Memory or Action Log Instance 5 = Change Log Instance 6 = GWP Log Instance 7 = Error Log

8.2.3.1. Attributes

xm--00	Composite xm block	Struct	na	Composite of entire block	
xm--04	Next File Byte Pointer	UL	na	Pointer to next byte IND570 will write to in log file.	
xm--05	File Status	By	na	0 = less than 75% full 1 = 75 to 90% full	2 = 90 to 99% full 3 = 100% full
xm--06	Next Buffer Byte Point	US	na	Position for the next byte written to the buffer.	
xm--07	Internal Buffer	By1024	na	Buffer for temporary records.	
xm--08	Total Record Count	UL	na	Total number of records.	
xm--09	Buffer Next Byte Pointer	US	na	Next record position for temporary buffer.	
xm--10	Temporary Buffer	Aby501	na	Temporary buffer for dynamic change.	

Note: Only instances 1 and 2 use these shared data elements. xm0407 and xm0507 are large buffers available for use in BRAM space.

8.2.4. Transaction Number Setup (XN)

Access:	"Maintenance" Level Access.	
Class Code:	Data Type:	PS
Instances:	1	

8.2.4.1. Attributes

xn0100	Composite xn block	Struct	na	Composite of entire block

xn0101	Transaction Number Enable	BI	na	0 = No. 1 = Yes
xn0103	Transaction Number Preset	L	na	Preset value to establish when resetting the transaction counter
xn0105	Enable Transaction Number Reset	BI	na	0 = No. 1 = Yes.

8.2.4.2. Method

The Resident Scale Task increments the Transaction Number (TN) each time the IND570 receives a "Demand Print" request for the specified print destination. Range is 1-999,999,999. The user may specify starting value for the TN register in the "Preset". The Weights and Measures seal does not protect the TN configuration.

8.2.5. System Setup (XS)

Access:	"Maintenance" Level Access The following fields have "Administrator" Level Security: xs0100, xs0101, xs0102, xs0122, and xs0128. The following fields are "Read Only": xs0103, xs0104, xs0133, xs0134, xs0151 and xs0152.
Class Code:	0x6A Data Type: PS
Instances:	1

8.2.5.1. Attributes

xs0100	Composite xs block	Struct	na	Composite of entire block	
xs0101	Market	By	na	0 = USA 1 = European Community 2 = Australia	3 = Canada 4=Argentina
xs0102	Legal for Trade	By	na	0 = No. 1 = Yes.	
xs0103	Software ID	S21	na	Software version	
xs0104	Software Part Number	S15	na	Part #s are 14 digits + null terminator	
xs0105	IND570 Serial #	S14	na	Serial #s are 13 digits + null terminator	
xs0106	IND570 ID	S21	na	Terminal ID	
xs0107	IND570 Project ID	S21	na	Project ID	
xs0108	IND570 Terminal ID	S161	na	User Text Description of the IND570	
xs0110	Date Format	By	na	1 = MM_DD_YY 2 = MMM_DD_YYYY 3 = DD_MM_YY 4 = DD_MMM_YYYY	5 = YY_MM_DD 6 = YYYY_MMM_DD 7 = YYYY_MM_DD 0 = none
xs0111	Time Format	By	na	1 = 24_MM 2 = 12_MM	3 =24_MM_SS 4 = 12_MM_SS
xs0112	Date Separator	S2	na	/"= Slash	" " = Space

				- = Hyphen . = Period	0 = None
xs0115	Operator Message Language	By	na	0 = English 1 = French 2 = German 3 = Spanish	4 = Chinese 5 = Custom 6 = Italian 7 = Custom 2 (Russian)
xs0116	External Keyboard Language	By	rt	0 = English 1 = French 2 = German	3 = Spanish 4 = Italian
xs0121	IND570x Backlight Timeout	US	na	In minutes	
xs0122	Local Gravity "Geo" Code	By	na	Value from 0-31. This value represents the gravitational acceleration depending on the latitude and altitude at this specific location where the IND570 is now operating. The IND570 uses it to adjust the weight value when you calibrate it in one location and use it in a different region of the world. Any value other than 0-31 disables this feature.	

Hardware Configuration

xs0127	# Nodes in Remote Discrete IO Unit	By	na	1-3 nodes. RST automatically sets during system installation, and verifies at power up.
xs0128	Restart/Reset Units at Power Up	By	na	0 = Start up at primary weigh units 1 = Restart at current weigh unit
xs0130	Keypad Language	By	rt	1 = Global2 = English3 = Russian
xs0132	IND570x Display Backlight	Bl	na	0 = Enable. 1 = Disable.
xs0135	Screen Saver	L	na	# of minutes of inactivity before turning off display. 0 = turn off screen saver 30 = default
xs0136	Metrology Control Number	L	na	Read only. Beginning value is 1.
xs0138	Second Shared Data Server Port	L	na	The IND570 always has a default Shared Data Server open on port 1701. If xs0138 is not 0 or 1701, IND570 will open a 2nd instance of the Shared Data Server on this assigned port #. Default = 0. Values of 0 and 1701 disable the second port. No validation for the entry value is performed by the terminal.
xs0143	Fill-570 Software ID Number	S40	na	Text description of installed software
xs0144	ACM500 Boot Software	S40	na	Text description of boot loader/code installed in ACM500
xs0151	ACM500 Firmware	S40	na	Text description of firmware installed in ACM500
xs0150	IND570 Boot Software ID Number	S21	na	Text description of boot loader/code installed in terminal
xs0151	iButton EEROM Option Image	ABY48	na	Permanent iButton image

xs0152	iButton Target Product	By	na	
xs0150	IND570 Firmware ID Number	S21	na	Text Description of Installed Terminal Software.
xs0151	Fill Application Software ID Number	S21	na	Text Description of Installed Application Software.
xs0155	Duplicate Print	By	na	Marks printout as a "DUPLICATE" 0 = Disabled. 1 = Footer. 2 = Header.
xs0156	Batttery Operation	By	na	0 = Disable, 1 = Enable
xs0157	Auto Power Off	By	na	0 = Disable, (Default) 1 = 10 minutes, 2 = 30 minutes, 3 = 60 minutes
xs0158	Reconnect Mode	By	na	0 = Manual (Default) 1 = Automatic,
xs0167	Screensaver type	By	na	0 = Graphic, 1 = Weight (default)
xs0168	Comma/Decimal	By	na	0 = Decimal (default), 1 = Comma
xs0169	Gross Legend	S4	na	"G" (default), 3 bytes at most
xs0170	Contrast adjustment	By	rt	Adjust the contrast of the display, values from 17 to 50 (0x11 to 0x32)
xs0171	Reserved	By	rt	
xs0172	Approval description	S81	na	Approval line of text in Metrology recall

8.2.6. System Commands (XK)

Access:	"Operator" Level Access
Class Code:	Data Type: D
Instances:	1

8.2.6.1. Attributes

xk0100	Composite xk block	Struct	Na	Composite of entire block
xk0111	Set Current Time of Day	S12	Rt	Set current time of day in format defined in xs0111
xk0112	Set Current Date	S12	Rt	Set current date in format defined in xs0110

8.2.7. System Monitoring & Service Data (XP)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PP
Instances:	1

8.2.7.1. Attributes

xp0100	Composite xp block	Struct	na	Composite of entire block
xp0101	Transaction Counter	UL	na	Transactions counter incremented according to the Transaction Counter Setup.
xp0103	Accumulation Sub-Total	D	Na	Transaction weight accumulation sub-total.
xp0110	Last Print Message	S1001	Na	Last Demand Print message. Used for DUPLICATE

				PRINT requests.
xp0112	Power Cycle Counter	UL	Na	Number of times power has cycled since last master reset.
xp0113	Current Power "ON" Timer	UL	Na	Number of minutes the IND570 power has been on since last power up.
xp0114	Usage Timer	UL	Na	Cumulative minutes that scale base weight is above 1% of scale capacity.
xp0117	Total Power on Timer	UL	Na	Cumulative total minutes the IND570 has been on since last Master Reset.
xp0120	Last Demand Print Destination	UL	na	Destination of last Demand or Custom print. DUPLICATE PRINT function uses it to route a duplicate print request to the last destination 1 = COM1 2 = COM2 3 = COM3 16 = Ethernet 1 15 = Ethernet 2 14 = Ethernet 3 17 = EPrint
xp0121	Last Error (1 of 5)	S81	rt	Error Code; Date, time
xp0122	Last Error (2 of 5)	S81	rt	
xp0123	Last Error (3 of 5)	S81	rt	
xp0124	Last Error (4 of 5)	S81	rt	
xp0125	Last Error (5 of 5)	S81	rt	
xp0126	Service Icon Status	By	na	0 = No Service Icon (default) 1 = Show Service Icon in system line.

8.2.7.2. Method

The system usage counters are maintained until a Master Reset occurs. An FTP Shared Data transfer can save these usage counters but cannot restore them. In the event of a Master Reset, all counters are reset.

8.2.8. Setup Sequencing Control (QC)

Access:	"Maintenance" Level Access.		
Class Code:	0x9a	Data Type:	D
Instances:	1		

8.2.8.1. Attributes

qc0100	Composite qc block	Struct	na	Composite of entire block
qc0148	Enter Setup Mode Command	Bl	rc	Command to CP and RST
qc0149	Exit Setup Mode Command	Bl	rc	Writing qc0149 = 1 is frequently required to "save" or "execute" other Shared Data entries.
qc0159	Trigger IND570 firmware upgrade	By	rc	Write 1 to trigger update. When complete, will be set to 0. User should ensure that USB memory

				containing new firmware is connected.
qc0160	Reset Data Connections	Bl	rc	1 = Reset all data connections
qc0161	Restart IND570	Bl	rc	1 = Perform soft restart of IND570
qc0168	Reconfigure PLC Thread	By	rc	1 = start, 0 = done
qc0169	Back up BRAM to flash	By	rc	1 = start, 0 = done The application sets this trigger to cause the Resident Scale Task to write the current contents of BRAM to a backup file in the Compact Flash memory. This backup must be performed before the battery is replaced. On power up, Shared Data automatically recovers the BRAM file from the flash backup file.
qc0170	CP Starting the Task Expert Application	By	rt	1 = Start Task Expert Setup Application
qc0182	The test of "Approval" and SW1-1	By	rc	Set field to "1" to initiate a check of the security switch (SW1-1)
qc0189	Remote Tare/Target Command	By	rt	This field enables a PC or PLC remotely set a new active Tare, Target, Weigh-in Target or Weigh-out Target from the standard IND570 tables. The Tare Table or Target Table record ID must first be set in qc0190 before issuing the command in qc0189. **Command values:** The PC/PLC sets commands in this field, as follows: 1 = Set an active Tare for scale from the Tare Table using ID in qc0190. 6 = Set an active Target for scale from Target Table using ID is in qc0190 ("6" can also be used to activate Dynamic Target from Dynamic Target Table if Dyn-570 is installed) 11 = Set an active Weigh-in Target for scale from Target Table using ID is in qc0190 16 = Set an active Weigh-out Target for scale from Target Table using ID is in qc0190 **Status values:** The IND570 sets the status of the command back in this same field, as follows: Command in progress = 255 No matching database record found = 254 Successful completion = 0 **Database record values:** Upon successful completion, the IND570 has also written the recalled Tare Table or Target Table record to the appropriate fields of the TD block

				(standard functionality) or the appropriate fields of the AR, AF and AP block (Fill-570), where the PC/PLC can read them.
qc0190	Tare or Target Table ID	S20	rt	Tare or Target Table ID for command in qc0189. You must first set this ID before issuing a command in qc0189. Can also be used to designate Dynamic Target Table ID if Dyn-570 is installed in terminal.

8.2.9. Board Identifications (BD)

Access: "Read Only" Access

Class Code: Data Type: D

Instances: 97

Instance 1 = IND570 Model Description
Instance 2 = Display Identification
Instance 3 = Main Board
Instance 6 = Ethernet Board
Instance 7 = COM/DIO Interface
Instance 8 = Digital Scale Type
Instance 13 = PLC Interface Board
Instance 14 = Remote Discrete I/O
Instance 15 = Digital Scale Options

8.2.9.1. Attributes

bd--00	Composite bd block	Struct	na	Composite of entire block
bd--01	Board Installed This Slot	Bl	na	0 = No. 1 = Yes.
bd--02	Description	S21	na	bd0102 = "IND570" for standard/safe area IND570
bd--03	Connected Scale Base Description	S14	na	Example: bd1503 = PBD330
bd--05	Board Type	By	na	0 = None 1 = Wisechip Display 2 = SEIKI display (default) 7 = Analog Main Board 10 = Digital Main Board 13 = Analog Output PLC Interface Board 16 = Profibus PLC Interface Board 17 = ControlNet PLC Interface Board 18 = DeviceNet PLC Interface Board 23 = Ethernet/IP PLC Interface Board 26 = Ethernet TCP/IP Board 31 = COM2/3 Board 32 = COM2/3 DIO Relay Board 34 = 5 input/8 output DIO Relay Board 38 = IDNet Option Board

8.2.9.2. Method

At power-up, the Resident Scale Task reads the hardware boards and writes their identification to Shared Data. The following table gives examples.

Instance 1	Model Description	
	bd0102	"IND570" for standard/safe area
Instance 2	Display module OLED type	
	bd0205	1 = Wisechip display 2 = SEIKI display (default)
Instance 3	Base board Two types of main board are available in the IND570 – analog and digital	
	bd0305	7 = Analog main board 10 = Digital main board
Instance 6		
	bd0605	26 = Ethernet TCP/IP
Instance 7	COM/DIO interface	
	bd0705	31 = COM2/3 board 32 = COM2/3/DIO board 34 = 5 input/8 output DIO board
Instance 13	PLC Interface Board	
	bd1305	13 = Analog Output PLC Interface Board 16 = Profibus PLC Interface Board 17 = ControlNet PLC Interface Board 18 = DeviceNet PLC Interface Board 23 = Ethernet/IP
Instance 14	Remote Discrete IO Unit	
	bd1405	1 = ARM100 Node1 3 = ARM100 Node1 & Node2 7 = ARM100 Node1 &Node2 &Node3
Instance 15	Digital scale options	
	bd1505	38 = IDNet option board 39 = SICSpro option board
	bd1503	"PBD330" Base Scale Type

8.2.9.2.1. Remote IO

The IND570 can support up to three ARM100 nodes, providing that there is no internal I/O board installed. If the ARM100 is connected with IND570:

bd1401	ARM100 Connected	1 = Yes 0 = No
bd1405	Number of ARM100s Connected	1 = 1 ARM100 3 = 2 ARM100s 7 = 3 ARM100s

8.2.10. Option Board ID & Calibration EEPROM (BC)

Access:	"Read Only" Access		
Class Code:		Data Type:	D
Instances:	1 (Always 5)		

8.2.10.1. Attributes

bc0500	Composite bc block	Struct	na	Composite of entire block
bc0501	Calibration Data Length	US	na	A length ! = 0 indicates factory has programmed calibration data in the EEPROM. The factory must also set a valid checksum.

Analog Board Calibration Fields, required for Analog Boards only

bc0505	Zero Counts with 2mv/V jumper	UL	na	A/D Counts at 0mv/V input w 2mv/V jumper
bc0506	Span Counts with 2mv/V jumper	UL	na	A/D Counts at 2mv/V input w 2mv/V jumper
bc0507	Zero Counts with 3 mv/V jumper	UL	na	A/D Counts at 0mv/V input w 3mv/V jumper
bc0508	Span Counts with 3 mv/V jumper	UL	na	A/D Counts at 2mv/V input w 3mv/V jumper
bc0599	BC block check sum	US	na	

8.2.11. USB Setup (UB)

Access:	"Supervisor" default level, customizable by individual field		
Class Code:	ub	Data Type:	
Instances:	1		

8.2.11.1. Attributes

ub0100	Composite ub block	Struct	na	Composite of entire block
ub0101 – ub0110	HID type of device, 1 to 10	Aby10	na	HID type + Vendor ID (VID) + Product ID (PID). Refer to the string definition in section 8.2.11.2, **Method**, below.
ub0111	Keyboard and Scanner Access	By	na	0 = Disabled (default), 1 = Enabled
ub0112	Memory Stick Access	By	na	0 = Disable, 1 = Read/Write, 2 = Read Only

8.2.11.2. Method

String Definition of "HID type +VID + PID"

1 Byte	HID type 1 = Keyboard, 2 = Bar code scanner;
30 Bytes	VID

31 Bytes PID

5 Bytes Reserved

In IND570, a USB keyboard and USB bar code scanner are both HID devices. To distinguish them, the keyboard and bar code scanner are treated as two different HID types. VID is the vendor ID, PID is the product ID. When a keyboard or a bar code scanner is connected to IND570, the above information is stored in this shared data.

8.2.12. Connected Devices (ED)

Access:	"Service" default level, customizable by individual field		
Class Code:	ed	Data Type:	
Instances:	7		

8.2.12.1. Attributes

ed--00	Composite ed block	Struct	na	Composite of entire block
ed--01	Description	S41	na	Description of a device
ed--02	Model	S21	na	Model of a device
ed--03	Note	S31	na	Notes concerning a device

8.2.13. System Feature Triggers & Controls (XC)

Access:	"Supervisor" Level Access		
Class Code:	0x96	Data Type:	D
Instances:	1		

8.2.13.1. Attributes

xc0100	Composite xc block	Struct	na	Composite of entire block

8.2.13.2. Triggers to disable features through a Discrete Input Keyswitch

xc0104	Disable Setup	Bl	rt	0 = Enable entry to Setup entry via terminal Softkey. 1 = Disable entry to Setup entry via terminal Softkey.
xc0106	Disable Terminal Keypad	Bl	rt	0 = Enabled. 1 = Disabled.

8.2.13.3. Triggers to activate/deactivate Ladder Logic

xc0112	Master Control Relay	Bl	rt	Master switch for turning on/off all discrete outputs. 1 = Discrete outputs enabled 0 = Discrete outputs disabled
xc0113	Run Ladder Logic	Bl	Rc	Run ladder logic
xc0114	Stop Ladder Logic	Bl	rc	Stop ladder logic

8.2.13.4. Triggers to turn on/off display

xc0115	Disable Display	Bl	rt	1 = Disable	0 = Enable

8.2.13.5. Triggers to Initiate Miscellaneous Functions from Discrete Inputs

xc0130	Enter Key Trigger	Bl	rc	1 = Same function as pressing Enter key from keyboard
xc0132	Run Calibration Test	Bl	rc	1 = Initiate
xc0134	Run ID1 (Prompt) Sequence	Bl	rc	Set to 1 to initiate ID1 (Prompt) sequence.
xc0136	Operate Strike Enter Key	Bl	rc	Key task sets this trigger to 1 when the operation presses the Enter Key.
xc0137	Toggle SmartTrac™	Bl	rc	Set to 1 to toggle between already set size and off (refer to XA block).
xc0139	Reprint Last Demand Print	Bl	rc	Set to 1 to trigger a reprint of the last demand or custom print. Applications use this trigger for DUPLICATE PRINT requests.
xc0142	Remote I/O Action	By	rt	0 = Pause Target. 1 = Pause Target and turn off all Discrete I/O until remote I/O OK.
xc0151	Frequency of PDX Cell Voltage Diagnostics	Bl	rt	0 = Run PDX Cell Voltage Diagnostic once every hour in no motion state 1 = Run PDX Cell Voltage Diagnostic once every 15 seconds
xc0159	Run ID2	Bl	rc	1 = Start ID2 sequence
xc0160	Run ID3	Bl	rc	1 = Start ID3 sequence
xc0161	Run ID4	Bl	rc	1 = Start ID4 sequence

8.2.13.6. Methods

These system triggers enable, disable, or activate IND570 functions through Discrete Inputs. You must setup Ladder Logic rungs to tie the Discrete Inputs to these triggers. Applications may also access these features by writing to these Shared Data triggers.

8.2.14. Service Information (SI)

Access:	"Service" default level is customizable by individual field		
Class Code:	si	Data Type:	
Instances:	1		

8.2.14.1. Attributes

si--00	Composite si block	Struct	na	Composite of entire block
si--01	Service	S41	na	
si--02	Free text field 1	S41	na	
si--03	Free text field 2	S41	na	

IND570 allows InSite direct access to these shared data; access is not possible using the terminal's HMI.

8.2.15. InTouch Setup (IT)

Access:	"Service" default level is customizable by individual field		
Class Code:	it	Data Type:	
Instances:	1		

8.2.15.1. Attributes

it--00	Composite it block	Struct	na	Composite of entire block
it--01	InTouch Function	By	na	0 = Disabled, 1 = Enabled
it--02	InTouch Server	By	na	InTouch server selection – "test", "production"
it--03	InTouch Region String	S31	na	Where
it--04	Customer Location Number	S41	na	Who

IND570 allows InSite direct access to these shared data; they cannot be accessed directly in the terminal.

8.3. Users and Security Data

8.3.1. Logged-In Users of Shared Data Server (XL)

Access:	"Read Only" Access	
Class Code:	Data Type:	D
Instances:	3	Shared Data Server supports up to 3 simultaneous user logins. Terminal front panel supports only one user login at a time.

8.3.1.1. Attributes

xl--00	Composite xl block	Struct	na	Composite of entire block	
xl--01	Logged-On User Name	S13	na	Name of user currently logged-on	
xl--02	Access Privilege Level of User	By	na	1 = Operator 3 = Service	2 = Supervisor 4 = Administrator

8.3.1.2. Methods

These fields will only report data if User security is enabled.

8.3.2. Access Security Setup (XU)

Access:	"Maintenance" Level Access		
Class Code:		Data Type:	PS
Instances:	20		

8.3.2.1. Attributes

xu--00	Composite xu block	Struct	na	Composite of entire block

xu--01	User Name	S13	na		
xu--02	Password	S13	na		
xu--03	Access Level	By	na	1 = Operator 3 = Service	2 = Supervisor 4 = Administrator
xu0102 is read only, and is always 4 (Administrator)					
xu0103 is read only, and is always 4 (Administrator)					
xu0201 default is anonymous with xu0203 = 1 (Operator access), but can be deleted or modified.					

9 Fill-570 Application

- **Important**: When the Fill-570 Application PAC is installed in the IND570 terminal, Shared Data definitions that appear in this chapter supersede those found for the same variables in other chapters.

9.1.1. Application Dynamic Commands and Events (AC)

Access:	"All Users" Access		
Class Code:	0x70	Data Type:	D
Instances:	1		

9.1.1.1. Attributes

ac0100	Composite ac block	Struct	na	Composite of entire block
ac0104	Start Weigh-In	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0105	Start Weigh-Out	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0106	Silence Alarm	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0107	Manual Jog	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0108	NO Key	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0109	OK Key	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.

9.1.1.2. Methods

Applications may use this block of Shared Data for receiving Dynamic commands. One use is communicating command data with remote tasks over PLC or TCP/IP communications.

Some shared data fields used in the basic terminal software also have functions when the Fill-570 is installed in the IND570 terminal.

sc0100	Composite sc block	Struct	na	Composite of entire block
sc0101	Resume Weigh-In or Weigh-out after Pause	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command. - Note: sc0101 functions only as "Resume" in the Fill-570 software. sc0101 is "Start/Resume" in basic terminal

				software.
sc0106	Pause/Abort Weigh-in or Weigh-out cycle	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command. If sp0121 is 0 (running), sc0106 performs a pause. If sp0121 is 1 (paused), sc0106 performs an abort.

9.1.2. Application Dynamic Statuses (AS)

Access: "All Users" Access
Class Code: 0x79 Data Type: D
Instances: 1

9.1.2.1. Attributes

as0100	Composite as block	Struct	na	Composite of entire block
as0101	OK to Weigh-IN	By	rt	Statuses enabling Application to respond to commands. Value switches between 0 (disabled/inactive) and 1 (enabled/active).
as0102	OK to Weigh-Out	By	rt	
as0111	Alarm	By	rt	
as0112	Auxiliary Out	By	rt	
as0113	Dump	By	rt	
as0114	Holding	By	rt	
as0115	Material 1	By	rt	
as0116	Material 2	By	rt	
as0117	Material 3	By	rt	
as0118	Material 4	By	rt	
as0119	Out of Tolerance	By	rt	
as0120	Ready	By	rt	
as0121	Running	By	rt	
as0122	Weigh-In Fast Feed	By	rt	
as0123	Weigh-In Feed	By	rt	
as0124	Weigh-Out Fast Feed	By	rt	
as0125	Weigh-Out Feed	By	rt	
as0126	Fill Start Delay	By	rt	
as0127	After Weigh Delay	By	rt	
as0128	Complete: Cycles	By	rt	
as0129	Complete: Weigh-in	By	rt	
as0130	Complete: Weigh-out	By	rt	
as0131	Material 1 Fast Feed	By	rt	
as0132	Material 1 Feed	By	rt	

as0133	Material 2 Fast Feed	By	rt	
as0134	Material 2 Feed	By	rt	
as0135	Material 3 Fast Feed	By	rt	
as0136	Material 3 Feed	By	rt	
as0137	Material 4 Fast Feed	By	rt	
as0138	Material 4 Feed	By	rt	
as0139	Material 5 Fast Feed	By	rt	
as0140	Material 5 Feed	By	rt	
as0141	Material 6 Fast Feed	By	rt	
as0142	Material 6 Feed	By	rt	
as0143	Material 5	By	rt	
as0144	Material 6	By	rt	

9.1.2.2. Methods

Applications may use this block of Shared Data for setting Dynamic statuses. One use is communicating status data with remote tasks over PLC or TCP/IP communications.

9.1.3. Application Floating Point Process Data (AF)

Access:	"Maintenance" Level Access.		
Class Code:	0x7E	Data Type:	PP
Instances:	1		

9.1.3.1. Attributes

af0100	Composite of af block, instance 1	Struct	rt	Composite of entire block, instance 1
af0200	Composite of af block, instance 2	Struct	rt	Composite of entire block, instance 2
af0108	Weight Variance (Fill)	D	rt	When Weigh-in mode is Fill, this is the net difference between fields af0161 and af0292. af00161 – af0292 = af0108
af0111	Weigh-In Target (Blend) – Material 1	D	rt	Target weight of Material 1 in active formula.
af0112	Spill – Material 1	D	rt	Spill value of Material 1 in active formula.
af0113	Fine Feed – Material 1	D	rt	Fine Feed value of Material 1 in active formula.
af0114	Upper Tolerance Value – Material 1	D	rt	Upper target weight deviation setting of Material 1 in active formula.
af0115	Lower Tolerance Value – Material 1	D	rt	Lower target weight deviation setting of Material 1 in active formula. Will show as a positive value.

af0116	Upper Tolerance Percent – Material 1	D	rt	Upper % of target deviation setting of Material 1 in active formula.
af0117	Lower Tolerance Percent – Material 1	D	rt	Lower % of target deviation setting of Material 1 in active formula. Will show as a positive value.
af0119	Actual Net Weight – Material 1	D	rt	Net weight of material #1 from current blend cycle.
af0120	Weight Variance – Material 1	D	rt	Net difference between fields af0111 and af0119. Field does not populate until a Demand Output is carried out at the end of the Blend.
af0121	Weigh-In Target (Blend) – Material 2	D	rt	Target weight of Material 2 in active formula.
af0122	Spill – Material 2	D	rt	Spill value of Material 2 in active formula.
af0123	Fine Feed – Material 2	D	rt	Fine Feed value of Material 2 in active formula.
af0124	Upper Tolerance Value – Material 2	D	rt	Upper target weight deviation setting of Material 2 in active formula.
af0125	Lower Tolerance Value – Material 2	D	rt	Lower target weight deviation setting of Material 2 in formula. Will show as a positive value.
af0126	Upper Tolerance Percent – Material 2	D	rt	Upper % of target deviation setting of Material 2 in active formula.
af0127	Lower Tolerance Percent – Material 2	D	rt	Lower % of target deviation setting of Material 2 in active formula. Will show as a positive value.
af0129	Actual Net Weight – Material 2	D	rt	Net weight of material 2 from current blend cycle.
af0130	Weight Variance – Material 2	D	rt	Net difference between fields af0121 and af0129. Field does not populate until a Demand Output is carried out at the end of the Blend.
af0131	Weigh-In Target (Blend) – Material 3	D	rt	Target weight of Material 3 in active formula.
af0132	Spill – Material 3	D	rt	Spill value of Material 3 in active formula.
af0133	Fine Feed – Material 3	D	rt	Fine Feed value of Material 3 in active formula.
af0134	Upper Tolerance Value – Material 3	D	rt	Upper target weight deviation setting of Material 3 in active formula.
af0135	Lower Tolerance Value – Material 3	D	rt	Lower target weight deviation setting of Material 3 in active formula. Will show as a positive value.
af0136	Upper Tolerance Percent – Material 3	D	rt	Upper % of target deviation setting of Material 3 in active formula.
af0137	Lower Tolerance Percent – Material 3	D	rt	Lower % of target deviation setting of Material 3 in active formula. Will show as a positive value.
af0138	Weight Variance – Material 3	D	rt	Net difference between fields af0131 and af0139. Field does not populate until a Demand Output is carried out at the end of the Blend.

af0139	Actual Net Weight – Material 3	D	rt	Net weight of material #3 from current blend cycle.
af0141	Weigh-In Target (Blend) – Material 4	D	rt	Target weight of Material 4 in active formula.
af0142	Spill – Material 4	D	rt	Spill value of Material 4 in active formula.
af0143	Fine Feed – Material 4	D	rt	Fine Feed value of Material 4 in active formula.
af0144	Upper Tolerance Value – Material 4	D	rt	Upper target weight deviation setting of Material 4 in active formula.
af0145	Lower Tolerance Value – Material 4	D	rt	Lower target weight deviation setting of Material 4 in active formula. Will show as a positive value.
af0146	Upper Tolerance Percent – Material 4	D	rt	Upper % of target deviation setting of Material 4 in active formula.
af0147	Lower Tolerance Percent – Material 4	D	rt	Lower % of target deviation setting of Material 4 in active formula. Will show as a positive value.
af0149	Actual Net Weight – Material 4	D	rt	Net weight of material #4 from current blend cycle.
af0150	Weight Variance – Material 4	D	rt	Net difference between fields af0131 and af0139. Field does not populate until a Demand Output is carried out at the end of the Blend.
af0151	Weigh-Out Active Value – Target Weight	D	rt	Weight of active Weigh-out Target when Weigh-out Mode is Dose.
af0152	Weigh-Out Active Value – Spill	D	rt	Spill value of active Weigh-out Target when Weigh-out Mode is Dose.
af0153	Weigh-Out Active Value – Fine Feed	D	rt	Fine Feed value of active Weigh-out Target when Weigh-out Mode is Dose.
af0154	Weigh-Out Active Value – Upper Tolerance Value	D	rt	Upper weight deviation value of active Weigh-out Target when Weigh-out Mode is Dose.
af0155	Weigh-Out Active Value – Lower Tolerance Value	D	rt	Lower weight deviation value of active Weigh-out Target when Weigh-out Mode is Dose.
af0156	Weigh-Out Active Value – Upper Tolerance %	D	rt	Upper Tolerance % of active Weigh-out Target when Weigh-out Mode is Dose.
af0157	Weigh-Out Active Value – Lower Tolerance %	D	rt	Lower Tolerance % of active Weigh-out Target when Weigh-out Mode is Dose.
af0158	Weight Variance - Weigh-out Cycle	D	rt	When Weigh-out mode is Dose, this is the net difference between fields af0151 and af0293.
af0160	Total Formula Weight	D	rt	Sum of all material Targets in active formula. af0111 + af0121 + af0131 + af0141 = af0160
af0161	Single Material Weigh-In (Fill) Active Value – Target	D	rt	Target weight if Weigh-in mode is Fill. Was sp0105 in IND560 terminals.
af0162	Single Material Weigh-In (Fill) Active Value – Spill	D	rt	Spill weight if Weigh-in mode is Fill. Was sp0109 in IND560 terminals.

af0163	Single Material Weigh-In (Fill) Active Value – Fine Feed	D	rt	Fine Feed weight if Weigh-in mode is Fill.. Was sp0110 in IND560 terminals.
af0164	Single Material Weigh-In (Fill) Active Value – Upper Tolerance Value	D	rt	Upper Target Weight Deviation setting if Weigh-in mode is Fill.. Was sp0111 in IND560 terminals.
af0165	Single Material Weigh-In (Fill) Active Value – Lower Tolerance Value	D	rt	Lower Target Weight Deviation setting if Weigh-in mode is Fill.. Was sp0112 in IND560 terminals.
af0166	Single Material Weigh-In (Fill) Active Value – Upper Tolerance %	D	rt	Upper % of Target deviation setting if Weigh-in mode is Fill.. Was sp0114 in IND560 terminals.
af0167	Single Material Weigh-In (Fill) Active Value – Lower Tolerance %	D	rt	Upper % of Target deviation setting if Weigh-in mode is Fill. Was sp0115 in IND560 terminals.
af0168	Refill Tare Value – Weigh-out cycle	D	rt	Tare value of supply vessel when refill of supply material begins.
af0170	Total Weight After "x" Cycles Completed	D	rt	Total materials weighed-in after set number of cycles (ax0131) is completed. Cycle tracking must be enabled. Was ap0170 in IND560.
af0171	Active Container Tare Value	D	rt	Reports last active Container Tare value regardless of current status (enabled or not). Used when absolute value for Container Tare is stored in record.
af0172	Active Container Tare Minimum Value	D	rt	Reports last active Container Tare value regardless of current status (enabled or not). Used when a range of tare values for are stored in Container Tare record.
af0173	Active Container Tare Maximum Value	D	rt	Reports last active Container Tare value regardless of current status (enabled or not). Used when a range of tare values for are stored in Container Tare record.
af0174	Gross Weight	D	rt	Actual gross weight after weigh-in cycle completes. Also the start weight at the beginning of the Dump cycle.
af0175	Net Weight Dumped	D	rt	Difference between gross weight of all materials weighed-in and end gross weight after dump cycle is completed. af0174 – wt0101 = af0175
af0176	Actual Total Formula Weight	D	rt	Sum of real time net weights of all materials in a formula. af 0176 = af0119 + af0129 + af0139 + af0149 + af0178 + af0188
af0177	Total Formula Variance	D	rt	Sum of target to weigh-in variances for all materials in formula. Field does not populate until a Demand Output is carried out at the end of the Blend. af0177 = af0120 + af0130 + af0140 + af0150 + af0187 + af0197
af0178	Weigh-In Target (Blend) – Material 5	D	rt	Target weight of Material 5 in active formula.
af0179	Spill – Material 5	D	rt	Spill value of Material 5 in active formula.

af0180	Fine Feed – Material 5	D	rt	Fine Feed value of Material 5 in active formula.
af0181	Upper Tolerance Value – Material 5	D	rt	Upper target weight deviation setting of Material 5 in active formula.
af0182	Lower Tolerance Value – Material 5	D	rt	Lower target weight deviation setting of Material 5 in active formula. Will show as a positive value.
af0183	Upper Tolerance Percent – Material 5	D	rt	Upper % of target deviation setting of Material 5 in active formula.
af0184	Lower Tolerance Percent – Material 5	D	rt	Lower % of target deviation setting of Material 5 in active formula. Will show as a positive value.
af0186	Material 5 Actual Net Weight	D	rt	Net weight of material 5 from current blend cycle.
af0187	Material 5 Weight Variance	D	rt	Net difference between fields af0178 and af0186. Field does not populate until a Demand Output is carried out at the end of the Blend.
af0188	Weigh-In Target (Blend) – Material 6	D	rt	Target weight of Material 6 in active formula.
af0189	Spill – Material 6	D	rt	Spill value of Material 6 in active formula.
af0190	Fine Feed – Material 6	D	rt	Fine Feed value of Material 6 in active formula.
af0191	Upper Tolerance Value – Material 6	D	rt	Upper target weight deviation setting of Material 6 in active formula.
af0192	Lower Tolerance Value – Material 6	D	rt	Lower target weight deviation setting of Material 6 in active formula. Will show as a positive value.
af0193	Upper Tolerance Percent – Material 6	D	rt	Upper % of target deviation setting of Material 6 in active formula.
af0194	Lower Tolerance Percent – Material 6	D	rt	Lower % of target deviation setting of Material 6 in active formula. Will show as a positive value.
af0196	Material 6 Actual Net Weight	D	rt	Net weight of material 6 from current blend cycle.
af0197	Material 6 weight variance	D	rt	Net difference between fields af0188 and af0196. Field does not populate until a Demand Output is carried out at the end of the Blend.
af0201	1st Partial Dose Gross Weight	D	rt	When Supply Material Confirmation is enabled, this reports the value of the 1st partial dose, before refill of supply material.
af0202	2nd rPartial Dose Net Weight	D	rt	When Supply Material Confirmation is enabled, this reports the value of the 2nd partial dose, after refill of supply material and after the dose is restarted.
af0203	Completed Dose Net Weight	D	rt	Sum of the 1st partial and 2nd partial doses.
af0204	Dump Cycle Gross Weight at Start	D	rt	Was af0174 in the IND560.
af0205	Dump Net Weight	D	rt	Was af0175 in the IND560.
af0210	Formula Auxiliary Output On	D	rt	Reports the weight at which the auxiliary output of the active formula will turn ON.

af0211	Formula Auxiliary Output Off	D	rt	Reports either the weight or expired time at which the auxiliary output of the active formula will turn OFF
af0231 – af0280	Pac Statistics Weight 1 – Pac Statistics Weight 50	D	rt	Pac Statistics calculates values based on the weight measurements of 50 cycles. The individual weights of the 50 cycles used to calculate the current Pac Statistics report are stored in shared date fields af0231 to af0280.
af0281	Pac Statistics Total Weight	D	rt	
af0282	Pac Statistics Maximum Weight	D	rt	
af0283	Pac Statistics Minimum Weight	D	rt	
af0284	Pac Statistics Median Weight	D	rt	
af0285	Pac Statistics Average Weight	D	rt	
af0286	Pac Statistics Standard Deviation (weight)	D	rt	
af0287	Pac Statistics Minimum Cycle Time	D	rt	
af0288	Pac Statistics Maximum Cycle Time	D	rt	
af0289	Pac Statistics Average Cycle Time	D	rt	
af0290	Pac Statistics Total Cycle Time	D	rt	
af0291	Pac Statistics - Cycle Start Time	D	rt	Reports the time of day, in seconds, when the current cycle started. It is used along with ap0149 to determine the length of the current cycle.
af0292	Actual Net Weight of Current Fill Cycle	D	rt	Used when Weigh-in mode is Fill.
af0293	Actual Net Weight of Current Dose Cycle	D	rt	Used when Weigh-out mode is Dose. Was wt0102 in IND560.
af0294	Gross Weight at End of Current Dump Cycle	D	rt	Was wt0101 in IND560.

9.1.4. Application Integer Process Data (AP)

Access:	"Maintenance" Level Access.		
Class Code:	0x7D	Data Type:	PP
Instances:	1		

9.1.4.1. Attributes

ap0100	Composite ap block	Struct	rt	Composite of entire block		
ap0103	Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**		
ap0104	Active Material #	US	rt	When Weigh-in Mode is Blend, this field reports the material # of a formula that is actively feeding. Possibilities are 1-6. This field reports a 1 if the Weigh-in Mode is Fill.		
ap0109	Fill-570 Processing Runtime State	US	rt	Used to store the current state of the Fill processing runtime state machine in case power is lost it can recover an continue when the power comes back on		
ap0111	Material 1 Units	US	rt	Units of Material #1 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0113	MATERIAL 1 – Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0116	Material 2 Units	US	rt	Units of Material #2 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0118	MATERIAL 2 – Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0121	Material 3 Units	US	rt	Units of Material #3 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces

ap0126	Material 4 Units	US	rt	Units of Material #4 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0128	MATERIAL 4 – Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0131	Weigh-Out Cycle Active Units	US	rt	1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
				Reported with wt0103 in IND560.		
ap0132	Weigh-Out Auto Spill Adjustment Cycle Counter	US	rt	The number of Dose cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0133	Material 5 Units	US	rt	Units of Material #5 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0135	MATERIAL 5 – Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0136	Single Material Weigh-In (Fill) Units	US	rt	1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0137	Material 6 Units	US	rt	Units of Material #6 in active Formula		
				1=pounds 2=kilograms 3=grams	4=metric tons 5=tons 6= lb-oz	8=penny weights 9=ounces
ap0139	MATERIAL 6 – Auto Spill Adjustment Cycle Counter	US	rt	The number of cycles carried out before the auto spill adjustment will make an adjustment to the spill value. This value will increment between 0 and one less than the Feed Cycle setting found at **Application > Pac > Advanced > Fill Adjustment > Cycles Average**.		
ap0140	Partial Dose State	US	rt	0 = Inactive. 1 = Partial does in progress.		
ap0141	Auxiliary Output Active Cycle	US	rt	0 = Weigh-in. 1 = Weigh-out.		

ap0142	Active Container Units	US	rt	1=pounds, 2=kilograms, 3=grams, 4=metric tons, 5=tons, 6= lb-oz, 8=penny weights, 9=ounces.
ap0144	Pac Statistics - Total Cycle Count	US	rt	The total number of Pac Statistics cycles whether "in tolerance" or "manually accepted out of tolerance". This count does not include aborted cycles. Values will be 1-50.
ap0145	Pac Statistics – In-Tolerance Cycle Count	US	rt	Total number of "in-tolerance" Pac Statistics cycles. This number should equal ap0144 less ap0146. This count only includes the number of in-tolerance cycles that occurred between the 1st and 50th cycle as tracked in ap0144.
ap0146	Pac Statistics - Number of Manually Accepted Out of Tolerance Cycles	US	rt	The number of out of tolerance cycles that have been manual accepted and included in the Pac Statistics calculations. Manually accepted out of tolerance cycles do NO increment the total cycle count (ap0144). This count only includes the number of manually accepted out of tolerance cycles that occurred between the 1st and 50th cycle as tracked in ap0144.
ap0147	Pac Statistics – Number of Out of Tolerance Cycles	US	rt	Total number of out of tolerance cycles, whether manually accepted or not.
ap0148	Pac Statistics – Number of Aborted Cycles	US	rt	Number of cycles that were aborted. This count only includes the number of aborted cycles that occurred between the 1st and 50th Pac Statistics cycle as tracked in ap0144.
ap0149	Pac Statistics - Cycle Count Start Date	US	rt	Reports the number of days passed since January 1, 1970. Note that there have been 10 leap years since 1970.
ap0151	Next Track Cycles Value	US	rt	When Track Cycles is set as "enabled", this field reports next cycle count. This is not the same cycle count as used in the Pac Statistics function.
ap0152	Cycles Remaining	US	rt	When Track Cycles is set as "enabled", this field reports remaining number of required, pre-programmed cycles. This is not the same cycle count as used in the Pac Statistics function.
ap0153	Current Cycle Value, "X of Y"	US	rt	When Track Cycles is set as "enabled", report current cycle count. This is not the same cycle count as used in the Pac Statistics function.
ap0154	Fill-570 Cycle Status	US	rt	Field is set to 1 when the Fill-570 is running a Fill, Blend, Dose or Dump process. Field will report a 0 when the Fill-570 is idle.
ap0155	Active Container Tare Table Record ID	US	rt	
ap0156	Numeric ID of Active Formula	US	rt	

ap0157	Active Formula Rescaled	US	rt	1 = Rescaled.

9.1.5. Application String Process Data (AR)

Access:	"All Users" Access		
Class Code:	0x7F	Data Type:	PP
Instances:	1		

9.1.5.1. Attributes

ar0100	Composite of ar block	Struct	rt	Composite of entire block
ar0101	Description – Material #1	S20	rt	Description of Target in Material #1 spot in current formula.
ar0102	Description – Material #2	S20	rt	Description of Target in Material #2 spot in current formula.
ar0103	Description – Material #3	S20	rt	Description of Target in Material #3 spot in current formula.
ar0104	Description – Material #4	S20	rt	Description of Target in Material #4 spot in current formula.
	Refer to ar0118 and ar0119 for Materials #5 and #6			
ar0105	Weigh-Out Active Value – Target Description	S20	rt	Description of Weigh-out Target when Weigh-out Mode is Dose.
ar0106	Single Material Weigh-In (Fill) Active Target - Description	S20	rt	Description of Target if Weigh-in mode is Fill. Was sp101 in IND560.
ar0107	Active Container Tare Description	S20	rt	Description of last active Container Tare record Reported regardless of status of Container Tare feature.
ar0110	Start Time	S20	rt	Format defined in xs0110
ar0111	Start Date	S20	rt	Format defined in xs0111
ar0112	Out of Tolerance Flag-Material #1	S20	rt	Character (*) to note "Out of Tolerance" status of weighed material. Field used for either the first material of a formula in a Blend cycle, the only material in a Fill cycle or the material in a Dose cycle. (^) indicates that the weight is out of tolerance and has been manually accepted by the operator.
ar0113	Out of Tolerance Flag-Material #2	S20	rt	Character (*) to note "Out of Tolerance" status of weighed material. (^) indicates that the weight is out of tolerance and has been manually accepted by the operator.
ar0114	Out of Tolerance Flag-Material #3	S20	rt	Character (*) to note "Out of Tolerance" status of weighed material. (^) indicates that the weight is out of tolerance and has been manually accepted by the operator.
ar0115	Out of Tolerance Flag-Material #4	S20	rt	Character (*) to note "Out of Tolerance" status of weighed material. (^) indicates that the weight is out of tolerance and has been manually accepted by the operator.
ar0116	Out of Tolerance Flag-	S20	rt	Character (*) to note "Out of Tolerance" status of weighed

	Material #5			material.
ar0117	Out of Tolerance Flag-Material #6	S20	rt	Character (*) to note "Out of Tolerance" status of weighed material.
ar0118	Description – Material #5	S20	rt	Description of Target in Material #5 spot in active formula.
ar0119	Description – Material #6	S20	rt	Description of Target in Material #6 spot in active formula.
ar0120	Formula Description	S20	rt	Active formula description
ar0121	Formula Rescale Indicator	S20	rt	Active formula rescaled = R Active formula not rescaled = blank

9.1.6. Application Message Table (AW)

Access:	"All Users" Access		
Class Code:	0x9C	Data Type:	PS
Instances:	1		

9.1.6.1. Attributes

aw0100	Composite aw block	Struct	na	Composite of entire block
aw0101 to aw0199	String Setup Fields 1-99	S101	na	

9.1.7. Application Integer Setup (AX)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

9.1.7.1. Attributes

ax0100	Composite ax block	Struct	na	Composite of entire block
ax0101	Weigh-In Mode	US	na	0 = None. 1 = Fill. 2 = Blend.
ax0102	Weigh-Out Mode	US	na	0 = None. 1 = Dose. 2 = Dump.
ax0103	Sequence Mode	US	na	0 = Automatic. 1 = Semi-Automatic.
ax0104	Zero Tolerance Check	US	na	0 = Disabled. 1 = Enabled.
ax0105	# of Materials to Weigh-In	US	na	1 to 6. # of enabled materials for a blend cycle. (Not # of materials actually programmed into a stored formula.)
ax0106	Material 1 Feed Speed(s)	US	na	1 or 2
ax0107	Material 2 Feed Speed(s)	US	na	1 or 2
ax0108	Material 3 Feed Speed(s)	US	na	1 or 2
ax0109	Material 4 Feed Speed(s)	US	na	1 or 2
	See ax0157 and ax0158 for materials #5 and #6			

ax0110	Track Cycles	US	na	0 = Disabled. 1 = Enabled.
ax0112	OK to Weigh-In Interlock	US	na	0 = Disabled. 1 = Enabled.
ax0113	OK to Weigh-Out Interlock	US	na	0 = Disabled. 1 = Enabled.
ax0114	Jog Mode	US	na	0 = Disabled. 1 = Automatic. 2 = Manual.
ax0115	Manual Out of Tolerance Accept	US	na	0 = Disabled. 1 = Enabled.
ax0116	Overfill Adjustment	US	na	0 = Disabled. 1 = Enabled.
ax0117	Auto Spill Adjustment	US	na	0 = Disabled. 1 = Enabled.
ax0118	Auto Spill Adjustment # of Cycled Averaged	US	na	1 to 9
ax0119	Auto Spill Adjustment Factor	US	na	1% to 99%
ax0120	Learn Mode	US	na	0 = Disabled. 1 = Enabled.
ax0121	Learn Mode Test Point	US	na	Value between 10% and 90%, by 10% increments
ax0122	Auxiliary Output	US	na	0 = Disabled. 1 = Enabled.
ax0123	Container Tare Description	US	na	0 = Disabled. 1 = Enabled.
ax0124	Container Tare Table	US	na	0 = Disabled. 1 = Enabled.
ax0125	Container Tare Table Totalization	US	na	0 = Disabled. 1 = Enabled.
ax0126	Sequence Tare	US	na	0 = Disabled. 1 = Enabled.
ax0127	Dose Speed(s)	US	na	1 or 2
ax0128	Refill Mode	US	na	0 = Automatic. 1 = Manual.
ax0129	Refill Tare	US	na	0 = Disabled. 1 = Enabled.
ax0130	Auxiliary Out Active Cycle	US	na	0 = Weigh-In. 1 = Weigh-Out.
ax0131	# of Cycles	US	na	1-999, as entered from # of cycles Softkey.
ax0132	Container Tare Table Report – Description	US	na	0 = Disabled. 1 = Enabled.
ax0133	Container Tare Table Report – Tare field	US	na	0 = Disabled. 1 = Enabled.
ax0134	Container Tare Table Report – Minimum Tare field	US	na	0 = Disabled. 1 = Enabled.
ax0135	Container Tare Table Report – Maximum Tare field	US	na	0 = Disabled. 1 = Enabled.
ax0136	Container Tare Table Report – n field	US	na	0 = Disabled. 1 = Enabled.
ax0137	Container Tare Table Report – Totals field	US	na	0 = Disabled. 1 = Enabled.
ax0138	Target Table Update with Learn Mode Values	US	na	0 = Update disabled. 1 = Update enabled.

ax0139	Target Table Update with Auto Spill Adjustment Values	US	na	0 = Update disabled. 1 = Update enabled.
ax0142	Weigh-in (Fill) target ID	US	na	Numeric ID of active target when Weigh-in mode is Fill.
ax0143	Weigh-out target ID	US	na	Numeric ID of active target when Weigh-out mode is Dose.
ax0144	Formula - Material #1 ID	US	na	Numeric ID of Material #1 in active formula when Weigh-in mode is Blend.
ax0145	Formula - Material #2 target ID	US	na	Numeric ID of Material #2 in active formula when Weigh-in mode is Blend.
ax0146	Formula - Material #3 target ID	US	na	Numeric ID of Material #3 in active formula when Weigh-in mode is Blend.
ax0147	Formula - Material #4 target ID	US	na	Numeric ID of Material #4 in active formula when Weigh-in mode is Blend.
ax0157	Material 5 feed speed(s)	US	na	1 or 2
ax0158	Material 6 feed speed(s)	US	na	1 or 2
ax0159	Cycle Tare	US	na	0 = Disabled. 1 = Enabled.
ax0160	Clear Tare	US	na	0 = Disabled. 1 = Enabled.
ax0161	Material Transition	US	na	0 = Semi-Automatic. 1 = Automatic.
ax0162	Weigh-In Transition	US	na	0 = Disabled. 1 = Hold. 2 = Weigh-in. 3 = Weigh-out.
ax0163	Weigh-out Clear Tare	US	na	0 = Disabled. 1 = Enabled.
ax0164	Refill Mode	US	na	0 = Automatic. 1 = Manual.
ax0165	Refill Tare	US	na	0 = Disabled. 1 = Enabled.
ax0166	Material Conservation	US	na	0 = Disabled. 1 = Enabled.
ax0167	Weigh-out Transition	US	na	0 = Disabled. 1 = Hold. 2 = Weigh-out.
ax0172	Formula - Material #5 target ID	US	na	Numeric ID of Material #5 in active formula when Weigh-in mode is Blend.
ax0173	Formula - Material #6 target ID	US	na	Numeric ID of Material #6 in active formula when Weigh-in mode is Blend.
ax0175	Pac Statistics Enabled	US	na	0 = Disabled. 1 = Enabled.
ax0176	Pac Statistics Trigger Cycle	US	na	0 = Blend. 1 = Dose. 2 = Dump. 3 = Fill.
ax0177	Formula Auxiliary Output	US	na	0 = Disabled. 1 = Enabled.
ax0178	Formula Totalization	US	na	0 = Disabled. 1 = Enabled.
ax0179	Formula Rescale Option	US	na	0 = Disabled. 1 = Formula %. 2 = Formula Target. 3 = Material Target.
ax0180	Formula Material Number	S20	rt	
ax0181	Formula Report Description	US	na	0 = Disabled. 1 = Enabled.
ax0182	Formula Report n	US	na	0 = Disabled. 1 = Enabled.
ax0183	Formula Report Total	US	na	0 = Disabled. 1 = Enabled.

9.1.8. Application Floating Point Setup (AY)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

9.1.8.1. Attributes

ay0100	Composite ay block	Struct	na	Composite of entire block
ay0101	Heel Weight	D	na	
ay0102	Zero Tolerance Value	D	na	
ay0103	Timer - Start Delay	D	na	1-999 seconds. Integer input only.
ay0105	Timer – After Weight Delay	D	na	1-999 seconds. Integer input only.
ay0106	Timer – After Empty Delay	D	na	1-999 seconds. Integer input only.
ay0107	Timer - Weigh-In Complete Signal	D	na	1-99 seconds. Integer input only.
ay0108	Timer - Weigh-Out Complete Signal	D	na	1-99 seconds. Integer input only.
ay0116	Jog Pulse Time (on)	D	na	0.1-9.9 seconds
ay0117	Jog Pulse Time (off)	D	na	0.1-9.9 seconds
ay0118	Auxiliary Output Trigger Weight (on)	D	na	Weight at which Auxiliary Output will turn ON.
ay0119	Auxiliary Output Time (off)	D	na	1-999 seconds. When Timed is selected for Auxiliary Output operation, this is the # of seconds the Auxiliary Output will stay on after trigger weight (ay0118) is reached.
ay0120	Auxiliary Output Weight Limit (off)	D	na	When Weight Range is selected for Aux Output operation, this is the weight at which the Auxiliary Output will turn OFF.
ay0121	Learn Mode Feed Time	D	na	0.1-9.9 seconds

9.1.9. Custom Trigger Commands & Statuses (CP)

Access:	"All Users" Access		
Class Code:	0x94	Data Type:	D
Instances:	1		

9.1.9.1. Attributes

cp0104	Blend/Fill Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0105	Cycle Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0106	Dose Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0107	Dump Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0114	Blend/Fill Trigger Status			Is set to 1 when the trigger initiates.
cp0115	Cycle Trigger Status			Is set to 1 when the trigger initiates.

cp0116	Dose Trigger Status			Is set to 1 when the trigger initiates.
cp0117	Dump Trigger Status			Is set to 1 when the trigger initiates.

9.1.10. Dynamic Scale Weight (WT)

Access: "Read Only" Access.
Class Code: 0x68 Data Type: D
Instances: 1 Instance 1 = Scale platforms 1

9.1.10.1. Attributes

wt0101	Displayed Gross Weight	S13	rt	Rounded Gross Weight shown in selected increment size.
wt0102	Displayed Net Weight	S13	rt	Rounded Net Weight shown in selected increment size.
wt0103	Weight Units	S4	rt	**lb** pounds, **kg** kilograms, **g**rams, **oz** ounces, **oz**troy, **dwt** pennyweights, metric **t**ons, **ton**, or custom units name

9.1.11. Scale Process Data (WS)

Access: "Read Only" Access.
Class Code: 0x66 Data Type: PP
Instances: 1

9.1.11.1. Attributes

ws0110	Displayed Tare Weight	S13	na	Rounded Tare Weight shown in selected increment size.

9.1.12. Scale Calibration (CE)

Access: "Administrator" Level Access, customizable by individual field
Class Code: 0x72 Data Type: PC
Instances: 1

9.1.12.1. Attributes

Multi-Range Parameters

ce0103	Primary Units	By	na	0=none 1=pounds 2=kilograms	3=grams 4=metric tons 5=tons

9.1.13. Application Integer Setup (AX)

Access: "Maintenance" Level Access.
Class Code: Data Type: PS
Instances: 1

9.1.13.1. Attributes

ax0131	Cycle "X" of "Y"			

9.1.14. Full Target Commands (SC)

Access:	"Supervisor" Level Access
Class Code:	0x92 Data Type: D
Instances:	1

9.1.14.1. Attributes

sc0102	Stop fill	BI	rc	Set from 0 to 1 to trigger command. If sp0121 is 0 (running), sc0102 performs a pause. If sp0121 is 1 (paused), sc0102 performs an abort.
sc0106	Pause fill	BI	rc	Set from 0 to1 trigger command. Operates only if target is running. Command puts target in pause state, turns off feed status, and turns on sp0121 pause status.

9.1.15. Full Target Process Data (SP)

Access:	"Supervisor" Level Access. sp0104 and sp0106 are Service level.
Class Code:	0x69 Data Type: PP
Instances:	1

9.1.15.1. Attributes

sp0101	Material Description	S21	na	Text name describing the Material
sp0105	Target Coincidence Value	D	rt	Weight value without units.
sp0109	Spill Weight Value	D	rt	This is a cutoff Spill Value for a weight Target When this field is set, the Target turns off the feed or fine feed when: Weight = (sp0105) – (sp0109).
sp0110	Fine Feed Weight Value	D	rt	For two-speed feeds, this field is a Fine Feed (slower feed) value. When this field is set, the Target turns off the Fast Feed when: Weight = (sp0105) – (sp0109) – (s0110)
sp0111	Upper Tolerance Value	D	rt	The Target uses this field to determine if the ACTUAL cutoff weight falls within this specified upper tolerance. This is the last OK weight when transitioning from "in tolerance" to "over tolerance". Value is in absolute weight or deviation from Target depending on sp0113.
sp0112	Lower Tolerance Value	D	rt	The Target uses this field to determine if the actual cutoff weight falls within this specified lower tolerance. This is the first OK weight when transitioning from "under tolerance" to "in tolerance". Value is in absolute weight or deviation from target depending on sp0113.
sp0114	Upper Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the upper tolerance value as a percent of the coincidence value.

sp0115	Lower Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the lower tolerance value as a percent of the coincidence value.
sp0120	Target Weight Units	By	na	0 = Primary units. 1 = Secondary units. 2 = Third units.

9.1.16. System State (XD)

Access:	"Read Only" Access.		
Class Code:	0x65	Data Type:	D
Instances:	1		

9.1.16.1. Attributes

xd0103	Current Date	S12	na	Format defined in xs0110
xd0104	Time of Day	S12	na	Format defined in xs0111

10 Simple Vehicle Application (Drive-570)

10.1. Shared Data Fields Serving as Print Variables in the Drive-570 Application Software

10.1.1. Application Dynamic String Fields (AK)

Access:	"All Users" Access		
Class Code:	0x6B	Data Type:	D
Instances:	1		

10.1.1.1. Attributes

ak0100	Composite ak block	Struct	na	Composite of entire block
ak0101	Vehicle ID	S101	rt	
ak0102	Vehicle Description	S101	rt	
ak0103	Gross Weight	S101	rt	
ak0104	Tare Weight	S010	rt	
ak0105	Net Weight	S010	rt	
ak0106	Transaction Time of Day	S010	rt	
ak0107	Transaction Date	S010	rt	
ak0108	Transaction Type	S010	rt	Permanent or Temporary
ak0109	Variable	S010	rt	
ak0110	Tare Type	S010	rt	Tare (T) or Preset Tare (PT)
ak0111	Weight Unit	S010	rt	lb, kg, ton, t
ak0112	Aux Gross	S010	rt	
ak0113	Aux Tare	S010	rt	
ak0114	Aux Net	S010	rt	
ak0115	Aux Unit	S010	rt	
ak0116	Inbound Weight	S010	rt	
ak0117	Inbound Date	S010	rt	

ak0118	Inbound Time	S010	rt	

10.1.2. System Monitoring & Service Data (XP)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PP
Instances:	1		

10.1.2.1. Attributes

xp0100	Composite xp block	Struct	na	Composite of entire block
xp0101	Transaction Number	UL	na	

10.1.3. Custom Trigger Commands & Statuses (CP)

Access:	"All Users" Access		
Class Code:	0x94	Data Type:	D
Instances:	1		

10.1.3.1. Attributes

cp0104	Inbound Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0105	Outbound Print Trigger	BI	rc	Is set to 1 when the trigger initiates.

11 Revision History

Document Revision	Firmware Version	Date	Changes
00	1.xx	12/2014	[Initial release]
01	Standard: 1.00.0065 Fill-570: 1.00.0092	6/2015	Added SD for Fill-570.

METTLER TOLEDO Service

To protect your METTLER TOLEDO product's future:

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a METTLER TOLEDO service agreement tailored to your needs and budget.

We invite you to register your product at www.mt.com/productregistration so we can contact you about enhancements, updates and important notifications concerning your product.

www.mt.com/IND570
For more information

Mettler-Toledo, LLC
1900 Polaris Parkway
Columbus, OH 43240
Phone 800 438 4511
Fax 614 438 4900

30205337 Rev. 01, 06/2015
Document version A

30205337