1392 Series
Temperature Indicator

1/8 DIN Temperature Indicator
With Retransmission

P/N 974143
REV 12/09
ECO# 35712

Dynisco

TABLE OF CONTENTS

1.0 QUICK START INSTRUCTION

1.1 Mounting

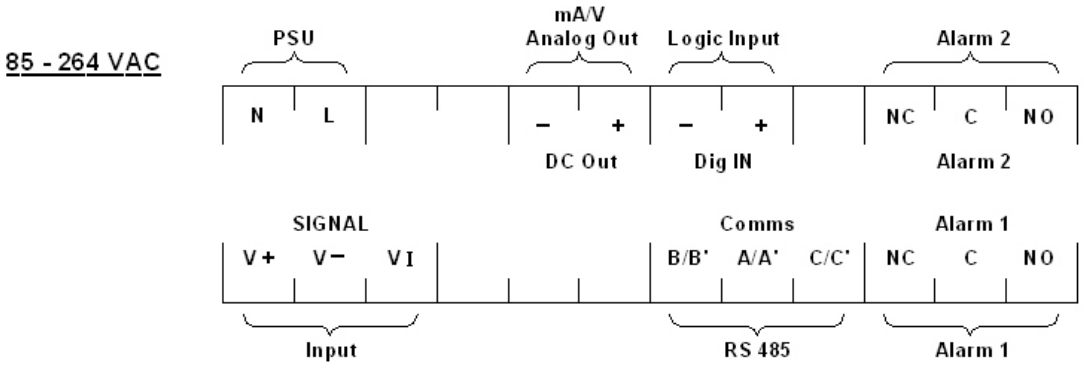
- Prepare panel cutout to specified dimensions
- Slide case through cutout and install mounting clips over case ends, engaging the detents in the case. Slide mounting clips fully forward (with the y side toward the front) until base is secure in panel.
-

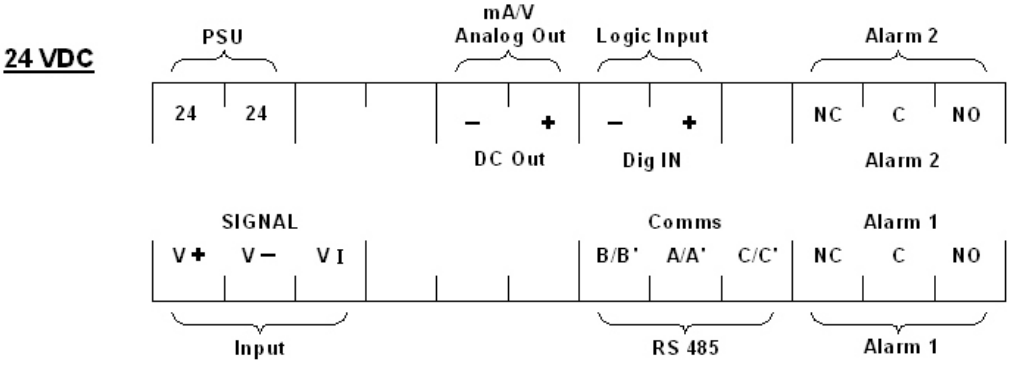
1.2 Wiring

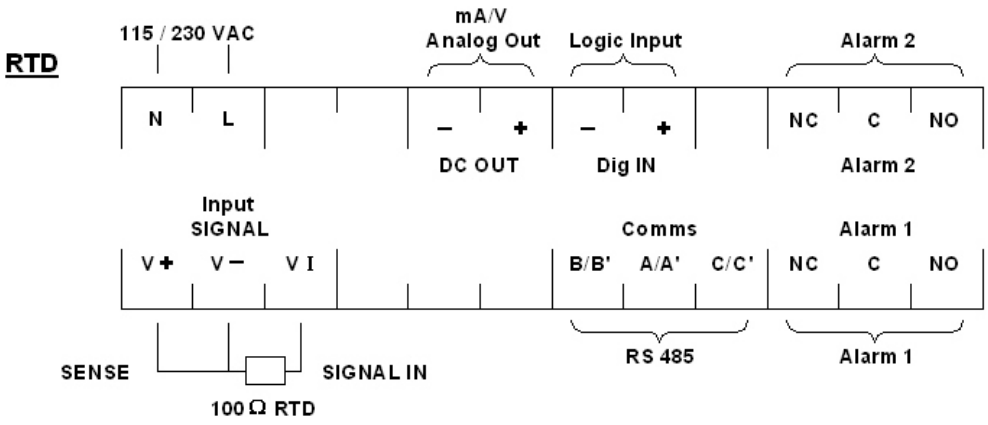
- Connect wires from cable to terminals as indicated below.
- Connect AC or AC/DC power as indicated in diagram. Note power type is dependant on model number, where:

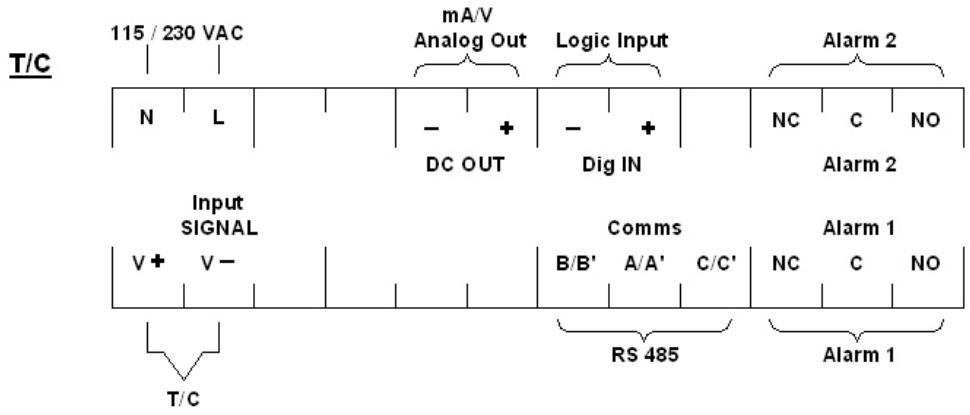
Universal Power Supply (85 - 264 Vac)	24 V (dc or ac)
1392-X-3	1392-X-1

- If applicable, connect alarm(s). Note that alarm defaults are High, Reverse Acting. Rear terminal locations as shown.









1.3 Scaling

- Slide instrument out of case. While pressing the **FUNC** button, insert instrument back into case, continue to hold **FUNC** button until **COnF** is displayed.
- Press **FUNC** once, then use the ▲▼ buttons to modify the units.
- Press **FUNC** to modify the decimal point.
- Press **FUNC**, display will read F.S.U. (Full Scale Value).
- Press and hold **FUNC** until display returns to actual display.

1.4 Instrument Configuration

- Remove the instrument from case.
- Press and hold **FUNC** button while re-inserting instrument into case.
- Continue to hold **FUNC** button.The display will show 1392, then the Software Version, then after 2 seconds, the display will show **COnF**.
- Press the **FUNC** button once. The display will show iP J
- Use the **UP/DOWN** arrows to select the appropriate input type (eg. 4-20mA, 0-10Vdc, etc).
- Note: If 0-20mA or 4-20mA is selected, be sure to install the supplied 2.49 ohm resistor across the V+ and V- terminals.
- Press the **FUNC** button to store the Input type setting and advance to the next parameter.
- Using the **UP/DOWN** arrows set the appropriate display units.
- Press **FUNC** to store the Display Units setting and advance to the next parameter.
- Using the **UP/DOWN** arrows set the appropriate Decimal Point position.
- Press **FUNC** to store the Decimal Point setting and advance to the next parameter.
- Display will alternate between F.S.U. and 10000, use the **UP/DOWN** arrows to set the appropriate Full Scale Units as specified on the Sensor.
- Press **FUNC** to store the FSU setting and advance to the next parameter.
- If further settings need to be modified, refer to Chapter 7 for a full description.
- Hold the **FUNC** button until display returns to Normal Operation.
- To set Alarm 1 and 2 thresholds, press the **FUNC** button until 1.Har is displayed.
- Modify the Alarm 1 threshold by using the **UP/DOWN** arrows until desired value is reached then press **FUNC** to store and proceed to Alarm 2 threshold.
- Repeat for Alarm 2 threshold and press **FUNC** to store when done.
- Secure the instrument in the case by pushing firmly in the bezel until it clicks into the retaining tabs.
- The Indicator is now ready for use.

2.0 INTRODUCTION

2.1 Important Information

This manual applies to the 1392 series of indicators only. For successful operation, the content of this manual must be read, understood, and followed in its entirety. This applies in particular to the notes on safety. Following the safety instructions will help to prevent accidents, defects and malfunctions.

DYNISCO will not be held liable for any injury, loss or damage resulting from failure to follow the instructions in this manual.

If product malfunctions, in spite of having followed the operating instructions, please contact the **DYNISCO** customer service department (See the back of the manual for contact information).

2.2 Copyright

2.3 Abbreviations

The following abbreviations are used:

- OM = Operating Manual
- F.S.U. = Full Scale Value

2.4 Features

- A peak reading display (high and low) selected from the front panel.
- A digital filter to reduce the effects of input variations on the display, analog output and alarms.
- Input interruption sensing to detect when a transducer or any one of its leads has been disconnected.
- A program lockout feature that disables the front keyboard to prevent unauthorized or accidental changes.
- A digital input that can be configured for either resetting the alarms or triggering hold on value.
- A digital display that provides operator prompts with messages to show currect status or errors.
- A compact, 48 mm x 96 mm (1.89” x 3.78”), 1/8 DIN enclosure that projects only 89.5 mm (3.52”) behind the panel.

2.5 User’s Obligations

The operator or owner of the larger overall system, e.g., a machine, is responsible for following the safety and accident prevention regulations that apply to the specific application.

3.0 NOTES ON SAFETY

The operator or owner of the larger overall system is responsible for following the safety and accident prevention regulations that apply to the specific application.

Warnings
Electrical shock can result in death or serious injury.
Avoid contact with the leads and terminals.
High voltage that may be present on leads can cause electrical shock.

Mounting and electrical connection of the 1392 must be done by specialists with EMC training, following all applicable regulations.

The 1392 series of indicators can be used in ambient temperatures up to 55°C.

Higher temperature can result in damage and malfunction.
Do not install the indicator in places where this temperature is exceeded.

DYNISCO will not be held liable for any injury, loss or damage resulting from failure to follow the instructions in this manual.

Permanently Connected Equipment
A disconnectable device must be fitted with one of the following items:
a) a switch or circuit breaker shall be included in the building installation
b) it shall be in close proximity to the equipment and within easy reach of the OPERATOR
c) it shall be marked as the disconnecting device for the equipment.

4.0 TECHNICAL DATA

4.1 Ordering Guide

1392-1-1	Dual Alarms with a 24Vdc Power Supply
1392-2-1	Dual Alarms and Analog Retrans with a 24Vdc Power Supply
1392-3-1	Dual Alarms and MODbus/JBus Comms with a 24Vdc Power Supply
1392-4-1	Dual Alarms, Analog Retrans and MODbus/JBus Comms with 24Vdc Power Supply
1392-1-3	Dual Alarms with a 85 to 264Vac Power Supply
1392-2-3	Dual Alarms and Analog Retrans with a 85 to 264Vac Power Supply
1392-3-3	Dual Alarms and MODbus/JBus Comms with a 85 to 264Vac Power Supply
1392-4-3	Dual Alarms, Analog Retrans & MODbus/JBus Comms with 85 to 264Vac Power Supply

4.2 Specifications

4.2.1 General

Protection Rating:	VO Rated fire retardant material Bezel designed and tested IP65 compliant for indoor locations Sleeve IP20 compliant Terminal block IP20 compliant Installation is IP65 compliant when specified gasket is used
Dimensions:	48 mm high x 96 mm wide x 99.3 mm deep (1.89” high x 3.78” wide x 3.9” deep) 1/8 DIN per DIN 43700 Less than 105 mm depth from front of panel
Installation:	Panel mounted, secured by 2 mounting clips
Cut-out :	45 mm high x 92 mm wide, + 0.8 mm/-0 mm (1.77” high x 3.62” wide, +0.03”/-0”)
Rear Terminal Block:	24 screw terminals with safety covers
Display:	5 red LED digits, 13.2 mm high 7 segments plus decimal point
Indicators:	3 amber LEDs for unit indication (°C / °F / PK) 2 red LEDs for alarm annunciator function 1 green LED for local/remote control indication
Keyboard:	Four domed buttons
Sample Rate:	10 Hz signal & > 0.5 Hz autozero
Common Mode Rejection:	Minimum 120 dB at 50 or 60 Hz

Normal Mode Rejection:	60 dB at 50 or 60 Hz
Accuracy:	Volt range: +/- (1 mV + 0.25% of measurement) mA range: +/- (250 µA + 0.25% of measurement + shunt resistor accuracy)
Temperature Drift:	Less than 200 ppm
Power Supply Options:	85 to 264Vac or 24Vac or dc, -15% +20%
Operating Altitude:	up to 2000 meters
Operating Temperature Range:	0 - 55˚C
Storage Temperature:	-30˚C to 70˚C
Operating Humidity Range:	5 - 85% RH non-condensing
Vibration :	10 to 150 Hz at a peak of 1G
Inter unit Spacing:	The recommended minimum spacing between controllers shown here should not be reduced to allow sufficient natural air flow 1.5” (38mm).
Cable Size:	For supply connections use 16AWG or larger wires rated for at least 75˚C. Use copper conductors only. For 24Vdc the polarity is not important. It is the User’s responsibility to provide an external fuse or circuit breaker.
Input Protection:	Internal thermistor Fusing for 85/265Vac fuse type T rated 1A 250V For 24Vac/dc fuse type T rated 4A 250

4.2.2 Linear Input specifications

Input:	0 - 5Vdc, 1 - 5 Vdc, 0 - 10Vdc, 2 - 10Vdc 0 - 20mA, 4 - 20mA (by external 2.49Ω resistor across rear terminals) Thermocouple & RTD
Input Span:	milliampere: 0 - 20mA +/- 27%
Volts:	-0.2V to 12.7V
Input Impedance:	Greater than 200KΩ
Linear	Volt Ranges
Input Impedance	Greater than 1MΩ
Linear	millivolt Range

Open Circuit Detection:	On 4 - 20mA by downscale fault On 0 - 5Vdc, 1 - 5Vdc, 0 - 10Vdc, 2 - 10Vdc by AC lead impedance measurement
Input Selection:	Internal according to instrument configuration
Input Resolution:	Adjustable by 1 up to 10000 Adjustable by 10 from 10000 to 99900 Decimal point may be set in any position
Measurement Resolution:	mA range: 1 µA
Volt range:	0.5 mV
50/60 Hz Line Filter	Universal 50 & 60 Hz rejection filter (no requirement to set line frequency).
Cable Impedance:	No errors due to cables if the two power supplying cables are matched
Isolation:	Isolated from all other I/O circuits up to 300 V RMS. Measurement category: CAT II.

4.2.3 Special Features

Display Filter:	First order digital filter on displayed value with configurable time constant of 0.4, 1, 2, 3, 4 or 5 seconds.
Peak Detection:	Automatic detection of maximum and minimum measured value.
Security Lock:	When the measured value is displayed (normal operating mode), you can lock or unlock the keyboard.

4.2.4 Alarms

Quantity:	Two independent alarm output relays type SPDT Form C
Contacts:	For each relay common, NC and NO contact are permanently available at the designated terminal
Contact Rating:	0.6A @110Vdc resistive load 0.5A @ 22 Vdc resistive load 0.3A @ 11 Vdc inductive load
Alarm Update Time:	100 mS
Alarm Filter:	Optional digital filter using same time constant as selected for the display filter

4.2.5 Serial Communications Interface

Type:	RS-485
Isolation:	Isolated (reinforced insulation) from instrument and all other I/O circuits.
Protocol:	MODbus and JBus
Baud Rate:	150 to 19200 baud
Format:	8 bits + parity 8 bits without parity
Parity :	Odd/Even

4.2.6 Analog Retransmission

Output Types:	0 - 20mA or 4 - 20mA, max load 500Ω 0 - 5Vdc or 0 - 10Vdc, keyboard selectable
Open Circuit Voltage:	Less than 25Vdc
Resolution:	11 bit (0.05% of full 20 mA span i.e. 10µA)
Calibration Accuracy:	Better than 0.2% of reading +/- 20µA Better than 0.2% of reading +/- 10mV
Linearity Error:	Less than 0.3% of reading
Filter :	Configurable digital filter on output value using same time constant as display filter
Temperature Drift:	Less than 100ppm/˚C (plus input drift)
Output Noise:	Within DC to 5 Hz measurement bandwidth less than resolution (i.e. < 10µA)
Update Time	100 mS

4.2.7 Logic Input

Input Type:	Voltage free contact
Source Current:	12mA
Closed State:	< 200Ω
Open State:	> 600Ω
Isolation:	Not isolated from instrument and all other I/O circuits

5.0 DESCRIPTION

The Dynisco model 1392 Linear Input Indicator is a flexible, programmable indicator designed for analog sensors. The five digit, 0.52” LED display provides a precise, readable indication of the measured value.

You can program the 1392 to display °C, °F, or None up to a Full Scale Value (F.S.U.) of 99,900 with an accuracy of ± 0.1%. The span value, alarm set points and other constants are stored indefinitely in non-volatile memory. Easy-to-remember pushbutton sequences simplify transducer calibration routines.

Two independent SPDT alarm relays are a standard feature of the 1392. The dual high or low set points are easily programmed from the front keyboard and are displayed on the digital display. The low alarms can be set as low alarm masked to inhibit alarm action during start up. Relay contacts are provided to activate an annunciator, or to initiate automatic shutdown if operating conditions exceed preset limits.

A programmable voltage to current retransmission output is available as an option. You can select a voltage output of 0 - 5Vdc or 0 - 10Vdc or current outputs of 4 - 20mA or 0 - 20mA to drive chart recorders or data acquisition equipment.

The Model 1392 can also be supplied with bidirectional and half duplex RS-485 serial communications. All signals are optically isolated and the baud rate is adjustable between 150 and 19200 baud.

6.0 TRANSPORT & DELIVERY

6.1 Transport, Packing, and Transort Damage

- Do not let the indicator be damaged by other items during transit.
- Use only the original packaging.
- Report transport damage to **DYNISCO** immediately in writing.

6.2 Storage

- Store the indicator in original packaging only.
- Protect against dust and moisture.

6.3 Shipment Includes:

- Model 1392 Indicator
- Two mounting clips
- 2.49Ω resistor
- Operating manual on CD, including CE Declaration of Conformity

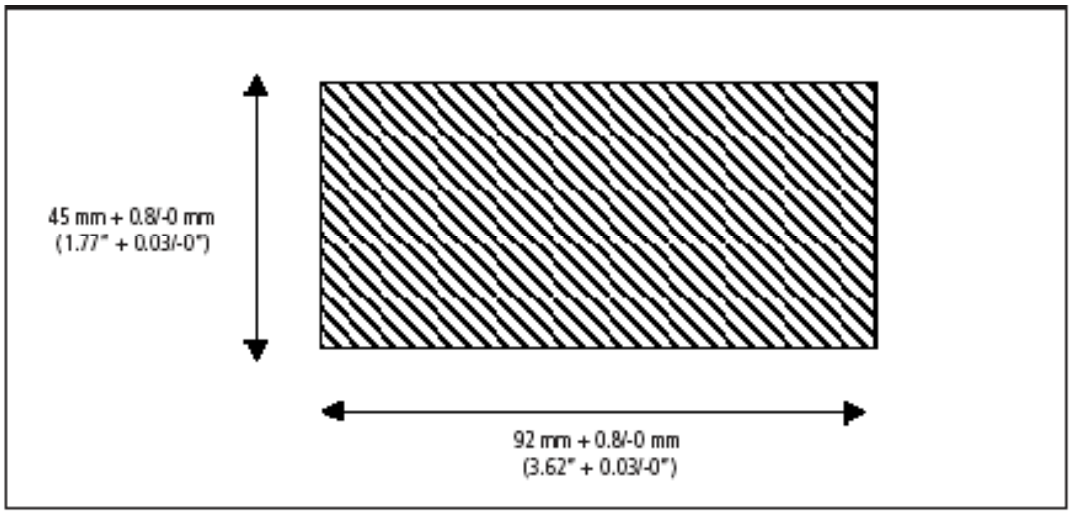
7.0 INSTALLATION

7.1 Unpacking

Inspect the package for shipping damage. If you notice any damage, notify the freight carrier immediately.

7.2 Unit Mounting

Fig 7-2 Panel Cutout



- Make the instrument panel cut-out with the specified cut out dimensions.
    - 1.77 +0.03/-0" high (45 +0.8/-0mm) x 3.62 +0.03/-0" wide (92 +0.8/-0 mm)
- Remove the unit from the instrument case. By spreading the two tabs on the front panel, then grasp the bezel and pull.
- Slide the instrument case through the cutout.
- Slide the panel clips from the rear over the instrument case so that the snap-in elements of the mounting frame engage in the recesses on the sides.
- Push clips toward the panel until firmly mounted.
- Slide the instrument from the front into the instrument case.
- Secure the instrument in the case by pushing firmly in the bezel until it clicks into the retaining tabs.

8.0 START-UP

8.1 Set-Up

8.1.1 Front Panel

The front of the Model 1392 is shown here. Key items on the front panel are:

- A five digit LED display
- LED indicators AL1 (Alarm 1) and AL2 (Alarm 2)
- LED indicator REM (Remote Status)
- Four domed buttons labeled RESET, ▼, ▲, FUNC.
  The pushbutton functions are listed below.
- LED indicators for °C / °F / PK

8.1.2 Pushbutton Functions

Button Sequence Resulting Operation

- Used to step between choices or to decrement a parameter value
- Used to step between choices, increment a parameter value or to display peak high or peak low

FUNC Used to store currently displayed parameter value, as modified and to display the next parameter, held in during power up for configuration mode and held in to exit configuration mode

RESET Used to scroll back to the previous parameter without storing the modified parameter value
RESET + or Alarm manual reset (either button sequence will reset both alarms)
RESET +
RESET + FUNC Reset peak high and peak low values
+ Initiate default data loading procedure
+ RESET + FUNC Used to lock or unlock keyboard for transducer calibration and parameter modification

To perform operations requiring two or more pushbuttons, press and hold the first pushbutton,

then press and hold the second pushbutton, and then press the third pushbutton, if required.
Note: You must follow the pushbutton sequences exactly as described.

8.1.3 Rear Terminal Connections

The electrical connections for the Model 1392 are shown. The layout of the terminals, is depicted from the rear.**19 COMMISSIONING**

Fig 8.1.3-1

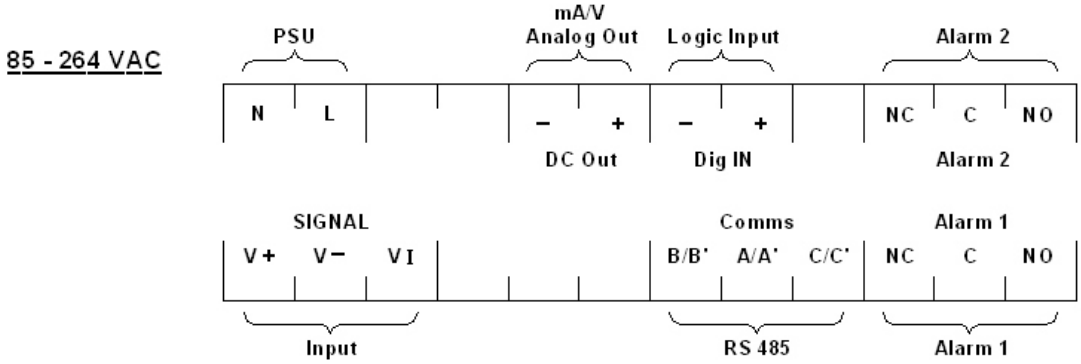


Fig 8.1.3-2

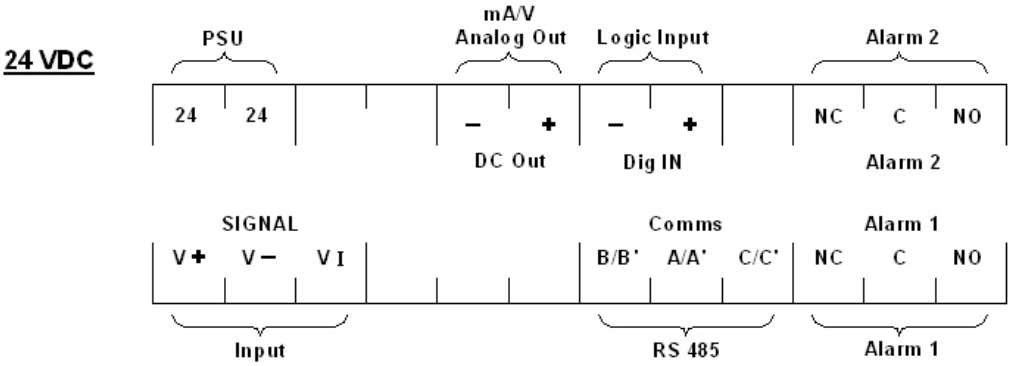


Fig 8.1.3-3

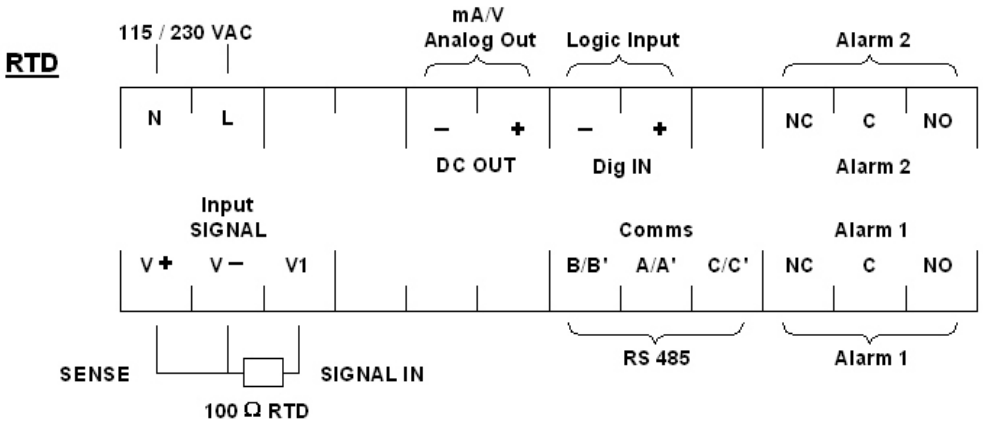
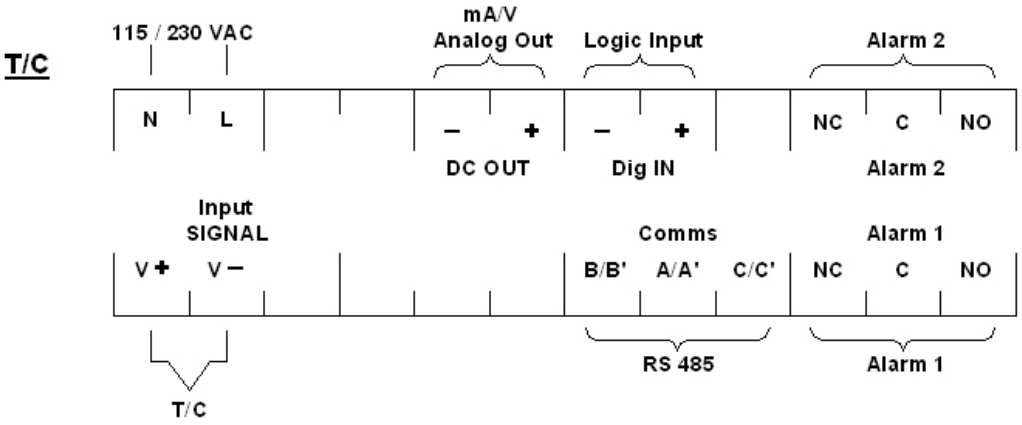


Fig 8.1.3-4



8.1.4 Configuration, Calibration Mode

To enter the configuration mode, hold the **FUNC** button while powering the unit on until **COnF** is displayed. A list of all configuration parameters starts.

- Press **FUNC** to initiate the configuration procedure, starting at the first parameter.
- Press **RESET** to initiate the configuration procedure, starting with the last parameter.
- Press to toggle the display from **COnF** to **CAL,** initiating output calibration mode, if required.

For each parameter you will either select one of several choices or enter a numerical value.

- Press to modify or change the parameter or increase the number displayed.
- Press to modify or change the parameter or decrease the number displayed.
- Press **FUNC** to save your changes and step to the next parameter.
- Press **RESET** to step to the previous parameter without saving your changes.

8.1.5 Configurable Parameters

The following is the complete sequence of configurable parameters in the configuration mode (**COnF**). Once the parameter is displayed, the used can toggle though various options from which to select. Display in digital LCD font.

Input Type " **IP** "
This parameter selects the type of input that will be used.
Selections: **J, K, E, L, N, R, S, T, Pt100rd, 0.20, 4.20, 0.5, 1.5, 0.10, 2.10**
Default: **J**
Note: 2.49Ω resistor is required for 0 (4) - 20 mA inputs.

Display Units "**Un**"
This parameter selects the temperature unit to display
Selections: °C or °F or Off = None
Default: **°C**

Decimal Point Position "_ _ _ _ **.** _ "
This parameter selects the decimal point position
Selections:
_ _ _ _ _ for no digits after the decimal point
_ _ _ _ **.** _ for one digit after the decimal point
_ _ _ **.** _ _ for two digits after the decimal point
_ _ **.** _ _ _ for three digits after the decimal point
_ **.** _ _ _ _ for four digits after the decimal point
Default**:** _ _ _ _ **.** _

Full Scale Readout " **F.S.U.** "
This parameter establishes the Full Scale Value
The display alternates between F.S.U. (Full Scale Value) and a numerical value from 10 to 99990. Only the numerical value is shown during modification.
Default: **1200.0**

Low Scale Readout " **L.S.U.** "
This parameter establishes the Low Scale Value
The display will alternate between L.S.U. (Low Scale Value) and a numerical value from 0 to 99990. This parameter establishes the display reading at the "zero" input (i.e., 4 mA input = 350).
Default: _**210.0**

Display Filter Time Constant " **F.t.C.** "
This parameter selects the Filter Time Constant.
.4 for 400 millisecond filter time constant
1 for 1-second filter time constant
2 for 2 second filter time constant
3 for 3 second filter time constant
4 for 4 second filter time constant
5 for 5 second filter time constant
Default: **.4mS**

Input Failsafe " **IFS** "
HI input fails high with sensor break
Lo input fails low with sensor break
no disabled
Default: **HI**

External Contact Function " **EC** "
This parameter selects the External Contact.
nr to enable external contact for manual alarm reset, via rear digital input terminals
Ho to enable external contact for hold-on-value sampling
Default: **nr** Alarm Manual Reset

Contact Status " **C5** "
This parameter selects the Contact Status
CL if function selected above is performed with contact closed, or
OP if function selected above is performed with contact open.
Default: **CL** Closure

Alarm 1 Operative Mode " **Al** "
This parameter selects Alarm 1 status
HA for High alarm with automatic reset
HL for High alarm with manual reset (High Latched Alarm)
LA for Low alarm with automatic reset
LL for Low alarm with manual reset (Low Latched Alarm)
OFF for no alarm 1
Default: **HA** High With Automatic Reset

Alarm Action " **Al** "
This parameter selects Alarm 1 condition. This step is skipped if Alarm 1 is **OFF**
REU for relay energized if no alarm condition (reverse action/fail safe), or
dir for relay energized if alarm condition (direct action).
Default: **reu** Reverse

Alarm 1 Masking Option " **Al** "
This parameter selects the Alarm 1 masking option. This function masks low alarm conditions during startup until the measured value first becomes greater than the alarm threshold plus hysteresis. The alarm must have been programmed as a low alarm. This step is skipped if Alarm 1 is **OFF** or **HIGH.**
dIS for masking option disabled, or
Enb for masking option enabled.
Default: **dIS** Disabled

Alarm 1 Filter " **Fl** "
This parameter selects the Filter. This step is skipped if Alarm 1 is **OFF.**
OFF for no filter on alarm threshold, or
xxx for filter with the time constant chosen in Display Filter Time Constant " **F.T.C.** "
Default: OFF

Alarm 1 Hysteresis " **Hl** "
This parameter selects Hysteresis value of 0.1 to 9.9. This step is skipped if Alarm is **OFF**.
Default: 1.0%

Alarm 2 Operating Mode " **A2** "
This parameter selects Alarm 2 status
Follow the same procedure as in steps F4 above.
Default: High with Automatic Reset

Serial Communications Protocol (Option)
This parameter selects the optional serial communications protocol
NbUS for Modbus protocol
JbUS for Jbus protocol

Analog Output (Option)
Analog Output type " **AO** "
Selects type of signal for retransmitting the displayed
0.20
4.20
0.10
0.5
OFF
Default: 4.20 (when option is fitted)

Analog Retransmission Low Scale Value " **Ar.L.S.U** "
Selectable within the boundaries of the input type.
Default: 0.0

Analog Retransmission full Scale Value " **Ar.F.S.U** "
Selectable within the boundaries of the input type.
Default: 1500.0 (must be higher than the Ar.L.S.U setting)

Analog Retransmission Filter Time " **r F "**
Filter time applied to the Analog Output 0.4 or matches Display Filter Time of OFF.
Default: OFF

Serial Communication Device Address
This parameter establishes the serial communication address with a number ranging from:
1 – 254 for Modbus/Jbus protocol (up to 128 devices per multidrop link)
Default: 1

Serial Communication Baud Rate " **bd** "
This parameter establishes the serial communication baud rate
150 for 150 baud
300 for 300 baud
600 for 600 baud
1.20 for 1200 baud
2.40 for 2400 baud
4.80 for 4800 baud
9.60 for 9600 baud
19.2 for 19200 baud

Default: 19200

Serial Communication Byte Format " **bF** "
This parameter establishes the serial communication byte format
8E for 8 bits with even parity
8O for 8 bits with odd parity
8 for 8 bits with no parity
Default: no parity

Note: The configurator skips this section if serial communication is NOT implemented.

Analog Retransmission Type (Option) " **RO** "
This parameter establishes the analog output on the retransmission signal.
0.20 for 0 – 20mA
4.20 for 4 – 20mA
0.10 for 0 – 10V
0.5 for 0 – 5V
OFF for retransmission disabled
Default: 4 – 20mA (if option purchased)

Analog Retransmission Scaling: Low Scale Value " **Ar.L.S.U.** "
This parameter establishes the lower limit for the analog output.
The display alternately shows the Analog Retransmission Low Scale Value and a numerical value. This parameter establishes the lower limit for the analog output; only the numerical value is shown during modification. Resolution and decimal point position are as selected for the readout value.
Default: 0.00

Analog Retransmission Scaling: Full Scale Value " **Ar.F.S.U.** "
This parameter establishes the upper limit for the analog output.
The display alternates between the Analog Retransmission Full Scale Value and a numerical value. This parameter establishes the upper limit for the analog output; only the numerical value is shown during modification. Resolution and decimal position are as selected for the readout value.
Default: 10000

Analog Retransmission Filter " **rF** "
This parameter establishes the filter status on the retransmission value.
OFF for no filter on retransmitted value
xxx for filter having the time constant chosen in step C.
Default: OFF

When parameters have been selected, press **FUNC** to lock in the paramter.

The configuration procedure is now complete and the display will return to show : " **COnF** "

8.1.6 Input Calibration

Note: Input calibration not required since unit is factory calibrated. Do not attempt unless unit requires calibration.

Place the indicator in **CAL** mode by pressing and holding down the **FUNC** button while powering up the unit. When the indicator shows **COnF**, press the **UP** arrow once to show **CAL** on the display. Press the **FUNC** button once to show **PHASE** on the display. Using a calibrated voltage reference source, connect the output leads of the reference source to the input terminals noting the proper polarity.

To calibrate the 4-20mA input:

1. Apply 0 mV to the indicator.
2. Press the **UP** arrow until n.u.Lo is displayed.
3. Press **FUNC**
4. When display shows GO. No, press the **UP** Arrow until YES is displayed.
5. Press **FUNC**
6. When display shows GO. End, press **FUNC** to exit.
7. Press **FUNC** until PHASE is displayed.
8. Apply 50 mV to the indicator.
9. Press the **UP** arrow until n.u.Hi is displayed.
10. Press **FUNC**
11. When display shows GO.No, press the **UP** Arrow until YES is displayed.
12. Press **FUNC**
13. When display shows GO. End, press **FUNC** to exit.
14. Proceed to calibrate the 0-10 volt input (if required)

To Calibrate the 0-10 V input:

1. Apply 0 volts to the indicator.
2. Press **FUNC** until PHASE is displayed
3. Press the **UP** arrow until “0” is displayed
4. Press **FUNC**
5. When display shows GO. No, press the **UP** Arrow until YES is displayed.
6. Press **FUNC**
7. When display shows GO. End, press **FUNC** to exit.
8. Press **FUNC** until PHASE is displayed.
9. Apply 10 Volts DC to the Indicator
10. Press the **UP** arrow until “10” is displayed.
11. When display shows GO.No, press the **UP** Arrow until YES is displayed
12. Press **FUNC**
13. When display shows GO. End, press **FUNC** to exit.
14. Hold down the **FUNC** button to return to Operating Mode.

Input Calibration is complete.

8.1.7 Analog Output Calibration

Place the indicator in **CAL** mode by pressing and holding down the **FUNC** button while powering up the unit. When the indicator show **COnF**, press the **UP** arrow once to show **CAL** on the display. Press the **FUNC** button until the appropriate C parameter is displayed. Connect a multimeter to DC Out + and DC Out -. Using the **UP/DOWN** arrows, adjusts the counts for the appropriate output:

C6 Retransmission current output minimum value – adjust to 50.0μA (near Zero)
C7 Retransmission current output maximum value – adjust to 20.00 mA
C8 Retransmission voltage output minimum value – adjust to 0.00 VDC
C9 Retransmission current output maximum value – adjust to 10.00 VDC

When compete, hold down the **FUNC** button to return to Operating mode.

Note: The above procedure only applies to indicators order with the output option. Units are precalibrated from the factory and do not require adjustment.**26 COMMISSIONING**

8.2 Operating Mode

In this mode the Model 1392 monitors the input signal, displays the measured value, and performs alarm functions. You can display high and low peak values, lock and unlock the keyboard, reset alarms, and perform transducer input calibration and alarm threshold settings. It is also possible to load default parameters.

Parameter values listed below can always be viewed, but they can be modified only if the indicator keyboard is unlocked. If anyone attempts to modify the parameters when the indicator is locked, the display will show **inh.**

8.2.1 Keyboard Lock/Unlock

When the measured value is displayed (normal operating mode), you can lock or unlock the keyboard by holding down the buttons in the following order, + **RESET** + **FUNC**. The display will then show the new desired mode: **Loc** or **UnLoc.**

8.2.2 Alarm Set Points

If the indicator has automatically returned to operating mode you can return to set the alarms by following this procedure.

1. Alarm 1

Press the **FUNC** key once. The display will alternately show **1.xxxx** and the alarm set point, where **xxxx** is a code for alarm operation mode. Only the alarm set point is shown during modification. Use the and keys to modify this parameter. Resolution and decimal point position are as selected for the readout value. Press **FUNC** to store your change. The indicator automatically returns to the normal operating mode after 6 seconds if no changes are made.

The codes for the remaining digits in the alarm-operating mode are:

2nd Digit	3rd Digit	4th Digit	5th Digit
H = High Alarm	**A** = Automatic reset	**d** = Direct action	**n** = Low alarm mask
L = Low Alarm	**n** = Manual reset	**r** = Reverse action	**blank** = Not masked

For example, a display of **I.HAr** would indicate High alarm, automatic reset, reverse action.

2. Alarm 2

The indicator will automatically enter this parameter after the **FUNC** key is pressed to store the Alarm 1 set point. To enter Alarm 2 from the normal operating mode, press **FUNC** five times. Programming the Alarm 2 set point is the same as Alarm 1 above, except that the display alternately shows **2.xxxx** and the alarm value.

8.2.3 Alarm Reset Function

This function can be performed when the indicator is locked; must be in local mode. If the alarm is configured as a latched alarm (manual reset), alarm status is maintained even after the alarm condition stops.

Press RESET + either arrow (or) to reset both Alarm 1 and Alarm 2. The external contact, if enabled, resets both alarms. The rear terminal connections are Dig In + and -. The external contact works even if the indicator is in the remote mode.

8.2.4 Peak Hold Function

The following actions can be performed when the indicator is locked, and in either local or remote mode.

1. Monitoring Peak High and Peak Low

By pressing while the measured value is displayed, it is possible to monitor the peak high value. The decimal point at the right of the display will be lit steadily.

Press again to monitor the peak low value. The decimal point at the right of the display will now blink on and off.

Press to redisplay the measured value (normal operating mode).

Press **RESET** + **FUNC** to reset the peak high/peak low values and to restart for a new peak detection.

2. Hold-On Value

The external contact can be used to freeze input signal sampling, holding the last measured value for use on the display, alarms, retransmission, etc. In this mode, the numerical value flashes on the display.

8.3 Default Data Loading Procedure

In each one of the Indicator's three modes, configuration, calibration and operation, you can load default data to reset all of the parameters for that particular mode.

To load the default data:

Press + , and once the display shows **dF OFF,** press . When the display shows **dF On,** press **FUNC**. Default data will now be loaded. During data loading time the display will show **L.dAtA.**

The default data for the three modes are shown on the following pages.

Note: Certain default data will vary depending on the region the unit was sold.

8.3.1 Default Data for Configuration Parameters

Description	**Default Setting**
Input Type	J
Units	C
Decimal point position	- - - - . -
Full scale units	1200.0
Low scale units	200.0
Display filter time constant	.4 mS
Input interrupt	High
External contact function	Alarm manual reset
Contact status	Closure
Alarm 1 operating mode	High with automatic reset
Alarm 1 action	Reverse
Alarm 1 masking option	Disable
Alarm 1 filter	Off
Alarm 1 hysteresis	1.0%
Alarm 2 operating mode	High with automatic reset
Alarm 2 action	Reverse
Alarm 2 masking option	Disable
Alarm 2 filter	Off
Alarm 2 hysteresis	1.0%
Serial communication type	Off (w/o RS-485) MODbus (w/RS-485)
Serial communication address	1
Serial communication baud rate	19200
Serial communication byte format 8	no parity
Analog retransmission type	4 - 20 mA (if fitted)
Analog retransmission low scale value	0.00
Analog retransmission high scale value	1500.0
Analog retransmission filter	.4

8.3.2 Default Data for Calibration Parameters

Default calibration parameters are provided to allow the user to verify that the instrument is working properly. They are not normally used as the final calibration values.

Caution: After default parameter loading, you should perform the proper indicator calibration procedure.

9.0 TROUBLESHOOTING & ERROR MESSAGES

Diagnostics are performed at indicator start-up and during normal mode operation. If a fault condition is detected, the display will show the message **Er** followed by an error code. The following is a list of possible errors in numerical order.

Er1

The alarm threshold values or transducer calibration (tare or zero) are out of limits or their values in memory are incorrect. The error may appear at instrument start-up in operating. After 3 seconds, the instrument will reset.
Simultaneously press and to load default data. Then load the desired threshold values and recalibrate the transducer.

Er6

This error message appears during tare or zero transducer calibration if input value is greater than +/-25% of full scale calibration. The same error message appears during full scale calibration if the stored zero calibration value is greater than +/-25% of the new full scale calibration. In both cases the stored calibration value is not changed. This error message disappears automatically after 2 seconds.

Er7

This error message appears during zero or full scale transducer calibration if a fault condition (hold-on value/overrange/underrange/input open) is found on an input signal or if the span value is not changed. This error message disappears automatically after 2 seconds.

Er38

Error detected during EAROM read operation. This error may appear at instrument start-up in operating mode. This error message disappears automatically after 3 seconds, and the instrument will reset. If the error persists, return the instrument to Dynisco.

If this error appears during configuration/calibration, press **FUNC** or **RESET** to restart the procedure and then repeat operations. If error persists, return the instrument to Dynisco.

Er39

Error detected during EAROM write operation. This error may appear in operating mode when storing new value in EAROM (for example, alarm threshold or transducer calibration). The new values will be enabled but they will be lost when the instrument is powered down. This error message disappears automatically after 10 seconds. If the error appears during configuration/calibration, press **FUNC** or **RESET** to restart the procedure and then repeat operations. If the error persists, return the instrument to your supplier.

Er40

This error occurs during an incomplete configuration save operation. The instrument had its power reset during a non-volatile ram write cycle. To clear, initiate the default data loading procedure and repeat the configuration and calibration procedure.

Er101

The configuration data stored in EAROM is wrong or inconsistent. This error may appear at instrument start-up in operating mode. This error message disappears automatically after 3 seconds. After that the instrument will reset.

If the error persists, enable configuration/calibration with the internal switch, load the default configuration data, and then perform a new configuration.

Er312

Error during internal autozero measurement for temperature drift compensation. The instrument repeats this check every 3 seconds. The analog retransmission and alarm go low scale or high scale as a fail safe configuration. If the error persists, return the instrument to Dynisco.

Er313

Calibration data fails checksum. To correct, initiate the default data loading procedure and recalibrate.

Er314

Instrument non-volatile memory un-initialized. Return to Dynisco.

Er315

Instrument non-volatile memory un-initialized. Return to Dynisco.

Er316

Instrument non-volatile memory un-initialized. Return to Dynisco.

Er317

Instrument non-volatile memory un-initialized. Return to Dynisco.

Er900

ROM error. Return to Dynisco.

Er901

RAM error. Return to Dynisco.

Er902

Key stuck detected. Check domed buttons for damage.

Er903

CPU fault. Return to Dynisco.

ooooo

Over-range indication.

This status is displayed when the A/D converter value is out of range, or the input signal is greater than full scale value plus 27% of span, or the displayed value exceeds the display capability of 99900.

-oooo

Under-range indication.

This status is displayed when the A/D converter value is out of range, or the input signal is less than full scale value minus 27% of span, or the displayed value exceeds the display capability of -1990.

OPEn

This message is displayed for an open voltage or thermo input, current reads 0.

10.0 CE DECLATION OF CONFORMATY

Dynisco

CE

Declaration of Conformity

Manufacturer's Name: **Dynisco Instruments**

Product Name: **1392 Process Indicator**

Model Number(s): **1392-XX-XX**

Support documents may accompany this certificate or by request.

The above product has been tested and proven to meet or exceed the following criteria:

- Safety Specification: EN61010-1: 2001
- EMC Emissions Specification: EN61326-1: 1997 Class B
  - including amendments A1, A2 and A3
- EMC Immunity Specifications: EN61326-1: 1997 Industrial locations
  - including amendments A1, A2 and A3

Manufacturing site: Unit 1, Faraday Close, Worthing, West Sussex, BN13 3RQ, United Kingdom

11/17/2009

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Franklin, MA 02038-3134
www.Dynisco.com
A Roper Industries Company

11.0 MODBUS & JBUS COMMUNICATIONS

12.1 Introduction

This half duplex protocol accepts one master and one or more slaves. The physical interface should be of the RS-485 type.

A single multidrop link can take up to 128 devices having the same “High Input Impedance” as the transceiver used.

The computer should be programmed to serve as a master controlling which slave has access to the link. All other slaves are in a waiting state. Each slave has a unique address ranging from 1 to 255. Address “0” is a broadcast one. When the master sends a message with address “0”, all slaves receive it and no one replies.

NOTE:
the numerical value present in this text are expressed as:
binary value if they are followed by b
decimal value if they are not followed by any letter
hexadecimal value if they are followed by h

12.2 Transmission Format

The protocol uses the RTU (Remote terminal unit) mode of transmission. RTU is a binary method with byte format composed as follows:

1 start bit, 8 data bit, 1 parity bit (optional), 1 stop bit. The communication speed is selectable among 150, 300, 600, 1200, 2400, 4800, 9600 and 19200 baud.

12.3 Communication Procedure

The communication can be initiated only by the master unit; the slave units can transmit only after a query has been received from the master. The general format for the transmission from master to slave is the following:

Range	Byte
Slave address	1
Function code	1
Data	n
Error check (CRC-16) (low byte)	1
Error check (CRC-16) (high byte)	1

The slave detects the start of a query frame when the delay time between two characters is greater than 3.5 T.U. (Time Unit = Time necessary to transmit one character).

12.4 Error Check (CRC-16 Cyclical Redundancy Check)

The CRC-16 value is calculated by the transmitting device. This value is appended to the message. The receiving device recalculates a CRC-16 and compares the calculated value to the received value. The two values must be equal.

The CRC-16 is started by first pre-loading a 16-bit register to all 1's. Then a process begins of applying successive the bytes of the message to the current contents of the register. Only the eight bits of data in each character are used for generating the CRC-16. Start and stop bits, and the parity bit if one is used, do not apply to the CRC-16.

During generation of the CRC-16, each byte is exclusive ORed with the register contents. Then the result is shifted to the right , with a zero filled into the most significant bit (MSB) position. If the LSB was a 1, the register is then exclusive ORed with a preset, fixed value. If the LSB was a 0, no exclusive OR takes place.

This process is repeated until eight shifts have been performed. After the last shift, the next byte is exclusive ORed with the register's current value, and the process repeats for eight more shifts as described above. The final contents of the register, after all the characters of the message have been applied, is the CRC-16 value.

A procedure for generating a CRC-16 is:

1. Load a 16-bit register (CRC-16 register) with FFFFh (all 1's)
2. Exclusive OR the first byte of the message with the low byte of the CRC-16 register. Put the result in the CRC-16 register.

3. Shift the CRC-16 register one bit to the right (toward the LSB), zero-filling the MSB. Extract and examine the LSB. (If the LSB was 0): Repeat Step 3 (another shift). (If the LSB was 1): Exclusive OR the CRC-16 register with the polynomial value A001h (1010 0000 0000 0001b).
4. Repeat Steps 3 and 4 until 8 shifts have been performed. When this is done, a complete byte will have been processed.
5. Repeat Steps 2 through 5 for the next byte of the message. Continue doing this until all bytes have been processed.
6. The final contents of the CRC-16 register is the CRC-16 value.

When the CRC-16 (16 bytes) is transmitted in the message, the low byte will be transmitted first, followed by the high byte.

An example of a C language function performing CRC generation is shown below.

```
/* - - - - - - - - - - - - - - - - - - - - - - - - - - - -
crc_16 calculate the crc_16 error check field
Input parameters:
buffer: string to calculate CRC
length: bytes number of the string
This function returns the CRC value.
- - - - - - - - - - - - - - - - - - - - - - - - - - - - -
*/
unsigned int crc_16 (unsigned char *buffer, unsigned int length)
{
unsigned int i, j, temp_bit, temp_int, crc;
crc = 0xFFFF;
for ( i = 0; i < length; i++ ) {
temp_int = (unsigned char) *buffer++;
crc ^= temp_int;
for ( j = 0; j < 8; j++ ) {
temp_bit = crc & 0x0001;
crc >>= 1;
if ( temp_bit != 0 )
crc ^= 0xA001;
}
}
return (crc);
}
```

12.5 Function Code 3 & 4: Words Reading

These function codes are used by the master unit to read a consecutive group of words (16 bit) which contain the value of the variable of the slave unit. The master can require a maximum of 20 words at a time.**38 M odbus/Jbus Communications**

Request from Master to Slave

Range	Byte
Slave address (1-255)	1
Function code (03-04)	1
Word starting address (high byte)	1
Word starting address (low byte)	1
Number of word (high byte)	1
Number of word (low byte)	1
Error check (CRC-16) (low byte)	1
Error check (CRC-16) (high byte)	1

Reply from Slave to Master

Range	Byte
Slave address (1-255)	1
Function code (03-04)	1
Byte counter (n)	1
Data Error check (CRC-16) (low byte)	1
Error check (CRC-16) (high byte)	1

The “Data” field contains the requested words in the following format: high byte of the first word, low byte of the first word, high byte of the second word, and so on. The “Data” field contains 8000h for not implemented addresses or for information not relevant in the actual device configuration.

Example: Ask to slave at address 29 (1Dh) the value of 3 words (3h) starting from word 178 (B2h)

Reply from Slave to Master

Range	Byte
Slave address	1Dh
Function code	03h
Byte counter	06h
Data	FFh
Data	9Ch
Data	80h
Data	00h
Data	05h
Data 5Ah	
Error check (CRC-16) (low byte)	D7h
Error check (CRC-16) (high byte)	0Dh

Request from Master to Slave

Range	Byte
Slave address	1Dh
Function code	03h
Word starting address (high byte)	00h
Word starting address (low byte)	B2h
Number of words (high byte)	00h
Number of words (low byte)	03h
Error check (CRC-16) (low byte)	A7h
Error check (CRC-16) (high byte)	B0h

The 6 bytes in “Data” field (FFh, 9Ch, 80h, 00h, 05h, 5Ah) are 3 words whose meaning is:

word 178 value = -100 (FF9Ch)
word 179 value = not implemented or not relevant (8000h)
word 180 value = 1370 (55Ah)

12.6 Notes

1. “Broadcast” Address

When using the writing codes (5, 6, 15 and 16) the slave address 0 is permitted: in this case all the slaves connected accept the command but do not give any reply.

2. Words Format

Every time the information transfer is performed by using 2 bytes (1 word of 16 bits), the first byte transmitted is the most significant one. For the negative numbers the “two complement” format is used.

3. Reply Time

The slave will start to send a reply from 2 ms to 700 ms after the end of the request detected by counting the received bytes.

4. Decimal Digits

The decimal point that may be present in the value is ignored.

Example:
The value 204.6 is transmitted as 2046 (07FEh)
The value -12.50 is transmitted as -1250 (FB1Eh)
Every location that needs a decimal point has a related variable containing the number of decimal digits; see also the “Attribute description” chapter.

Variable Value	Meaning
0	Number without decimal digit
1	Number with one decimal digit
2	Number with two decimal digits
3	Number with three decimal digits
4	Number with four decimal digits

5. Multiplier

Same parameters have a related variable stated as “multiplier”; this system allows to overcome the limits of +/- 32767 counts.

Example:
The measure value 80000 is sent as:
800 at ModBus address 133 (input variable without filter)
100 at ModBus address 262 (multiplier x 100)

6. Local/Remote Status

At power up the slave will be in local mode. It is necessary to set the local/remote device status (ModBus address 218). Returns to local mode when a write to illegal address occurs.

Local Mode: The communication between master and slave is limited to transferring data from slave to master without possibility of modifying any parameter from the master itself (with the exception of the local/remote device status). Therefore from the local keyboard, parameters can be displayed and modified.

Remote Mode: The instrument parameters can be modified by the master. Therefore, from the instrument front the parameters can be only displayed but not modified.

7. Lock/Unlock Operative Parameters

The modification of the operative parameters can be protected (ModBus address 217).

8. Attribute Description

Every variable has one or more of the following attributes:

Attribute Meaning
R The variable is readable
W The variable is writable (some restrictions may occur)
D The variable is linked to another variable for decimal point
M The variable is linked to another variable for multiplier

9. Address Space

The whole variables are addressable as word as well as bit; the user may choose the better way according to the condition. Although common sense suggests managing analog variables as words and boolean variables as bits, below is described the behavior to access analog variables (example: alarm threshold) as bits and boolean variables (example: local/remote device status) as words.

- Reading analog variables as bits: if the variable is not relevant in the actual device configuration (word value 8000h) or if the value is zero the bit is reset, otherwise the bit is set.
- Writing analog variables as bits: the reset bit means 0000h, the set bit means 0001h.
- Reading boolean variables as words: a reset variable is reported as 0000h, a set one is reported as 0001h.
- Writing boolean variables as words: send 0000h to reset the variable, send a value different from 0000h and 8000h to set the variable.

12.7 Error Codes

If the “error check” is wrong or the function code is not implemented or a buffer overflow has been received, the slave does not send any reply to the master. If other errors are detected in the request or command frame, or the slave cannot reply with the requested values or it cannot accept the requested sets because it is in error condition, the slave replies by forcing at “1” the bit 7 of the “function code” byte followed by an error code.

12.7.1 Error Reply (from Slave to Master)

Range	Byte
Slave address	1
Function code (+80h)	1
Error code	1
Error check (CRC-16) (low byte)	1
Error check (CRC-16) (high byte)	1

12.7.2 List of Error Codes

Error Number	Description
2	Illegal data address
3	Illegal data value
9	Illegal number of data required
10	The bit or word indicated cannot be modified
80	Error on EEprom writing

12.8 Operative Mode Addresses

Jbus Address	MODbus Address	Description	Display Code	Attribute
121	120	Manufactured trade mark Range: 50 (32h)	R	
122	121	Device identification code Note: Nr. of software revision x 100 + identification code (1309h for 1390)	R	
123	122	Reserved RDM		
124	123	Filtered input variable RDM Notes: When an error is detected on measure, the”Data field” contains one of these error codes: 30002 (7532h) = Open sensor ckt 30004 (7534h) = Under-range 30005 (7535h) = Over-range 30050 (7562h) = Error on internal auto-zero 30053 (7565h) = Calibration span too small (<= 7% of input span)		
125	124	Measure status Range: 0 = Measure normal 1 = Measure in hold	R	
*126	125	Peak max value RDM Notes: The openings of the input (E 2) will have influence on the peak value stored in accordance with programmed fail safe		
*127	126	Peak min value RDM Notes:The openings of the input (E 2) will have influence on the peak value stored in accordance with programmed fail safe		
128	127	Variation on alarm status R Notes: Alarm status information is on D8: (1 for entrance, 0 for exit) Number of alarm is on low byte (D2-D0). Alarm 0 means that the device has no status alarm variation to send. The device is able to memorize up to 8 variations on alarm status. The oldest non-sent alarm variations are lost		
129	128	Status alarm 1 R Range: 0 = No alarm 1 = Alarm		

Jbus Address	MODbus Address	Description	Display Code	Attribute
130	129	Status alarm 2 R Range: 0 = No alarm 1 = Alarm		
*131	130	Alarm 1 threshold RWDM		
*132	131	Alarm 2 threshold RWDM		
134	133	Input variable without filter RDM Notes: When an error is detected on measure, the”Data field” contains one of these error codes: 30002 (7532h) = Open sensor ckt 30004 (7534h) = Under-range 30005 (7535h) = Over-range 30050 (7562h) = Error on internal auto-zero 30053 (7565h) = Calibration span too small (<= 7% of input span)		
*218	217	Lock/unlock device status RW Range: 0 = Unlock device 1 = Lock device		
*219	218	Local/remote device status RW Range: 0 = Device in local 1 = Device in remote Notes: See note 6 at page 40.		
220	219	Unsolicited request flag R Range: 0 = No Parameters change has occurred 1 = change has occurred on parameters marked with *Notes: The word is set at the start-up. Changes produced by serial link will not be flagged. The word resets after reading.		

Jbus Address	MODbus Address	Description	Display Code	Attribute
223	222	Tare calibration Range: 0 = Disable calibration 1 = Enable calibration	(“tARE”)	W
224	223	Last calibration status Range: 0 = Idle 1 = calibration in progress 3 = calibration done without error 4 = calibration done with error Notes: After reading, the word is set to 0 if the value read is 3 or 4.	R	
225	224	Peak reset W Range: 0 = No operation 1 = Peak reset		
226	225	Manual reset of alarm 1 condition W Range: 0 = No operation 1 = Reset alarm 1		
227	226	Manual reset of alarm 2 condition W Range: 0 = No operation 1 = Reset alarm 2		
228	227	Load default control parameters value W Range: 0 = No operation 1 = Load default Notes: Refer to device manual for listing of default value.		

Jbus Address	MODbus Address	Description	Display Code	Attribute
259	258	Decimal point position Range: 0 = No decimal figure 1 = One decimal figure 2 = Two decimal figures 3 = Three decimal figures 4 = Four decimal figures Note: Decimal figure assigned to: - Initial scale readout - Final scale readout - Input variable without filter - Filtered input variable - Peak max value - Peak min value - Full scale transducer calibration value - Tare calibration value - Alarm 1 threshold - Alarm 2 threshold	R	
260	259	Initial scale readout RDM		
261	260	Final scale readout RDM	(“F.S.U.”)	RDM
263	262	Multiplier R Range: 1 - 10 - 100 Note: Multiplier assigned to: - Initial scale readout - Final scale readout - Input variable without filter - Filtered input variable - Peak max value - Peak min value - Full scale transducer calibration value - Tare calibration value - Alarm 1 threshold - Alarm 2 threshold		
264	263	Display filter time constant Range: 1 = 400 ms filter time constant 2 = 1 s filter time constant 3 = 2 s filter time constant 4 = 3 s filter time constant 5 = 4 s filter time constant 6 = 5 s filter time constant	(“F.t.C.”)	R

Jbus Address	MODbus Address	Description	Display Code	Attribute
265	264	Input fail safe Range: 0 = Down scale burn out (Lo) 1 = Up scale burn out (Hi)	(“I.F.S”)	R
269	268	External contact function Range: 0 = Enable external contact for manual alarm reset (nr) 1 = Enable external contact for stop on measuresampling (Ho)	(“E.C.”)	R
270	269	Contact status Range: 0 = The selected external contact function is performed with contact open (OP) 1 = The selected external contact function is performed with contact close (CL)	(“C.S.”)	R
271	270	Alarm 1 operative mode Range: 0 = Low alarm with manual reset (LL) 1 = Low alarm with automatic reset (LA) 2 = High alarm with manual reset (HL) 3 = High alarm with automatic reset (HA) 4 = No alarm 1 (OFF)	(“A1”)	R
272	271	Alarm 1 action Range: 0 = Relay energized in alarm condition (dir = direct action) 1 = Relay energized in no alarm condition(rEV = reverse action)	(“A1”)	R
273	272	Alarm 1 Masking Option Range: 0 = Masking Option Disabled 1 = Masking Option Enabled	(“A1”)	R

47

Jbus Address	MODbus Address	Description	Display Code	Attribute
274	273	Alarm 1 filter Range: 0 = No Filter on alarm threshold (OFF) 1 = Filter on alarm threshold (On) see ModBus address word 261	(“A1”)	R
275	274	Alarm 1 hysteresis	(“H1”)	RD
276	275	Number of decimal figures related to: Alarm 1 hysteresis		R
277	276	Alarm 2 operative modeRange: 0 = Low alarm with manual reset (LL) 1 = Low alarm with automatic reset (LA) 2 = High alarm with manual reset (HL) 3 = High alarm with automatic reset (HA) 4 = No alarm 2 (OFF)	(“A2”)	R
278	277	Alarm 2 action Range: 0 = Relay energized in alarm condition(dir = direct action) 1 = Relay energized in no alarm condition(rEV = reverse action)	(“A2”)	R
279	278	Alarm 2 masking option Range: 0 = Masking option disabled (diS) 1 = Masking option enabled (Enb)	(“A2”)	R
280	279	Alarm 2 filter Range: 0 = No Filter on alarm threshold (OFF) 1 = Filter on alarm threshold (On) see ModBus address word 261	(“A2”)	R
281	280	Alarm 2 hysteresis	(“H2”)	RD
282	281	Number of decimal figures related to: Alarm 2 hysteresis		R
283	282	Serial interface protocol Range: 0 = Modbus 1 = Jbus	(“Ser”)	R
284	283	Serial communication address	(“Adr”)	R

48 Modbus/Jbus Communications

Jbus Address	MODbus Address	Description	Display Code	Attribute
285	284	Serial communication baud rate Range: 0 = 9600 Baud 1 = 19200 Baud 2 = 150 Baud 3 = 300 Baud 4 = 600 Baud 5 = 1200 Baud 6 = 2400 Baud 7 = 4800 Baud	(“bd”)	R
286	285	Serial communication byte format Range: 1 = 8 bits + even parity 2 = 8 bits + odd parity 0 = 8 bits without parity	(“bF”)	R

12.0 WARRANTY & SERVICE

This equipment is subject to the mutual agreement that it is warranted to be free from defects of material and construction but our liability in connection with it shall be limited to repairing or replacing without charge at our factory any material or construction defects which become apparent within one year from the data on which the equipment is shipped, that we have no liability for damages of any kind arising from the installation or use of this apparatus by anyone and that the purchaser by the acceptance of this equipment will assume all liability for any damages which may result from its use or misuse by the purchaser, his or its employees or by others. There is no guarantee or warranty or liability except as here stated.

Should the equipment require service or repair, please call for a Return Material Authorization Number, and return it, along with a brief description of any problem(s) encountered, freight prepaid to:

Dynisco Instruments
38 Forge Parkway
Franklin, MA 02038
Attn: Repair Dept. **RMA# (Include RMA#)**

Please call for a Return Material Authorization Number before returning product to Dynisco.

Questions concerning warranty, repair cost, and delivery should be directed to the Dynisco Repair Department, telephone number 508-541-9400 or E-mail: repair@mc.dynisco.com.

For further technical assistance, call 800-221-2201