Model 1390 Strain Gage Input Indicator
Installation and Operation Manual

OPERATING MANUAL

P/N 974128
08/05 Rev. D
ECO # 30337

Dynisco

Table of Contents

1. MODEL 1390 QUICK START INSTRUCTIONS

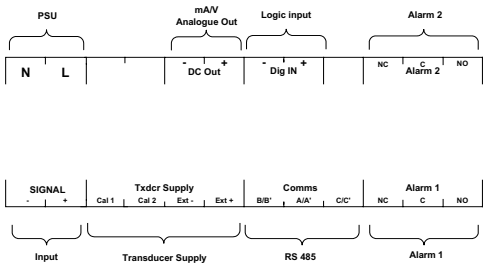
1.1 MOUNTING

- 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.

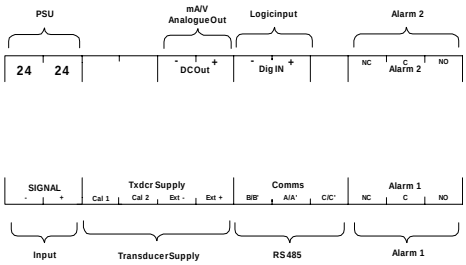
1.2 WIRING

- 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.
- If applicable, connect alarm(s). Note that alarm defaults are High, Reverse Acting.

Universal Power Supply (85 - 264 Vac)
1390-X-3



24 V (dc or ac)
1390-X-1



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).

- Using the Up and Down arrow keys, select the value that matched the full scale of the transducer. Enter with **FUNC** key. (If your transducer was purchased in the US, it is preset at 10,000 psi, and no adjustment is necessary).
- Press and hold **FUNC** until display returns to pressure reading.
- Secure the instrument in the case by pushing firmly in the bezel until it clicks into the retaining tabs.

1.4 CALIBRATION AND OPERATION

- When power is applied the display will read 1390, then the software version and then the pressure reading. At this point, be sure that no pressure is applied and that the transducer is at operating temperature.
- Press the **FUNC** key and the legend **LO.OFF** appears. Using the Up arrow key, advance the legend to **LO.ON**.
- Press the **FUNC** key to initialize zero calibration. After approximately 5 seconds, the legend **F.U.S.C.** will appear and alternate with the full scale value.
- Press the Up arrow key to advance to the legend **FU ON**. Using the FUNC key, initiate the full scale calibration. After 5 seconds, the indicator will read 0 ± 10.
- Press the **FUNC** key until, **1.HAr** is displayed and alternates between alarm set-point. Use the up and down arrow keys to set the appropriate alarm set-point.
- Press the **FUNC** key until, **2.HAr** is displayed and repeat for second alarm set-point.
- Press the **FUNC** key to return to pressure display.
- The system is now ready for use.

2. GENERAL

2.1 IMPORTANT INFORMATION

This manual applies to the 1390 series of indicators only. It must be kept near the equipment in a readily and immediately accessible location at all times. 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 EXPLANATION OF ICONS

The manual uses icons to indicate information pertaining to safety:

ATTENTION Risk of destruction or damage to equipment, machines or installations

General danger to life or limb

Specific danger to life or limb

You MUST do this

The safety instructions are provided again in the individual chapters of the manual.

2.4 ABBREVIATIONS

The following abbreviations are used:

OM	Operating Manual
F.S.U	Full Scale Value
PT	Pressure Transducer

2.5 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 alrams 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.

2.6 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. 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 PT and the 1390 must be done by specialists with EMC training, following all applicable regulations.

The 1390 series of pressure 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. TECHNICAL DATA

4.1 ORDERING GUIDE FOR 1390

1390-1-1	Dual Alarms with a 24 Vdc Power Supply
1390-2-1	Dual Alarms and Analog Retrans with a 24 Vdc Power Supply
1390-3-1	Dual Alarms and MODbus/JBus Comms with a 24 Vdc Power Supply
1390-4-1	Dual Alarms, Analog Retrans and MODbus/JBus Comms with a 24 Vdc Power Supply
1390-1-3	Dual Alarms with a 85 - 264 Vac Power Supply
1390-2-3	Dual Alarms and Analog Retrans with a 85 - 264 Vac Power Supply
1390-3-3	Dual Alarms and MODbus/JBus Comms with a 85 - 264 Vac Power Supply
1390-4-3	Dual Alarms, Analog Retrans & MODbus/JBus Comms with a 85 - 264 Vac 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 designed for be 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	4 amber LEDs for unit indication 2 red LEDs for alarm annunciator function 1 green LED for local/remote control indication
Keyboard	Four domed buttons
Sample Rate	100 mS
Common Mode Rejection	Minimum 120 dB at 50 or 60 Hz
Normal Mode Rejection	60 dB at 50 or 60 Hz
Accuracy	+/- 0.1% of FSV with Shunt Cal
Temperature Drift	Less than 100 ppm/deg C of FSV
Power Supply Options	85 - 264 Vac or 24 V(ac 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 24V the polarity is not important. It is the Users responsibility to provide an external fuse or circuit breaker.
Input Protection	Internal thermistor Fusing For 85/265Vac fuse type T rated 1A 250V For 24 V ac/dc fuse type T rated 4A 250V

4.2.2 Strain Gage Input

Input	350 Ohm Strain Gage
Bridge Connection	4 or 6 wire (6 to use internal shunt cal switch)
Bridge Excitation	10 V +/- 7%
Bridge Sensitivity	1.4 - 4 mV/V
Input Signal Span	- 25% to +125% of full scale (approximately -10 mV to +50 mV)
Calibration	Internal switch between CAL2 & CAL1 terminals. External resistor only.
Shunt Value	From 40% to 100%
Zero Balance	+/- 25% of FSV
Tare	+/- 25% of FSV
Readout	Keyboard programmable from 10 to 99,900
Input Resolution	Adjustable by 1 up to 2010 Adjustable by 10 from 2010 to 20100 Adjustable by 100 up to 99900 Decimal point may be set in any position
Open Circuit Detection	On any of the four transducer leads selectable up or down scale fault mode. By internal 1.33 MOhm pull down resistors to EXT - on both Sig + and Sig - terminals.
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.

4.2.4 ALARMS

Quantity	Two independent alarm output relays of type SPDT Form C
Contacts	For each relay common, NC and NO contact are permanently available at the designated terminal.
Contact Rating	0.6A @110 Vdc resistive load 0.5A @ 220 Vdc resistive load 0.3A @ 110 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 COMMUNICATION 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 - 20 mA or 4 - 20 mA, maximum load 500 Ohms 0 - 5 Vdc or 0 - 10 Vdc Software Selectable
Open Circuit Voltage	Less than 25 Vdc
Resolution	11 bit (0.05% of full 20 mA span i.e. 10 uA)
Calibration Accuracy	Better than 0.2% of reading +/- 20 uA Better than 0.2% of reading +/- 10 mV
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 100 ppm/deg C (plus input drift)
Output Noise	Within DC to 5 Hz measurement bandwidth - less than resolution (i.e. ‹ 10 uA)
Update Time	100 mS

4.2.7 LOGIC INPUT

Input Type	Voltage free contact
Source Current	12 mA
Closed State	‹ 200 Ohms
Open State	› 600 Ohms
Isolation	Not isolated from instrument and all other I/O circuits.

5. DESCRIPTION

The Dynisco model 1390 Strain Gage Indicator is a flexible, programmable indicator designed for 350 Ohm strain gage based sensors, such as pressure transducers and load cells. The five digit, 0.52" LED display provides a precise, readable indication of the measured value.

You can program the 1390 to display in various engineering units 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 1390. 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 annuciator 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 - 5 Vdc or 0 - 10 Vdc or current outputs of 4 - 20 mA or 0 - 20 mA to drive chart recorders or data acquisition equipment.

The Model 1390 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. TRANSPORT/DELIVERY

6.1 TRANSPORT/PACKING/TRANSPORT 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 SCOPE OF DELIVERY

- Indicator
- Two mounting clips
- Operating manual with declaration of conformity

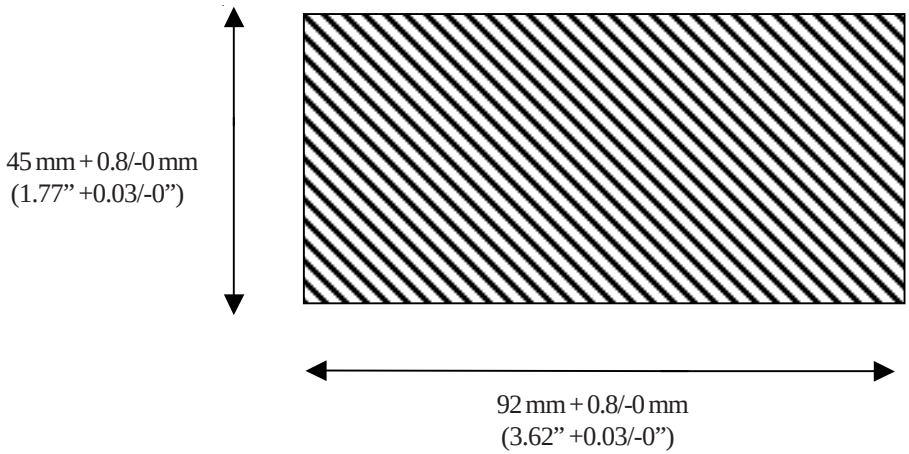
7. INSTALLATION

7.1 UNPACKING

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

7.2 MOUNTING

Fig. 7-1 Panel Cutout



- Make the instrument panel cut-out with the specified cut out dimensions.
- 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.

Fig. 7-2 Side View with Mounting Clip

8. COMMISSIONING

8.1 SET UP

8.1.1 FRONT PANEL

The front of the Model 1390 is shown in Figure 7.1. 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 in the table below.
- LED indicators for pressure indicators kgf/cm², PSI, BAR, MPa.

Fig. 8-1 Front Panel

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 **RESET +** ▲	Alarm manual reset (either button sequence will reset both alarms)
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 1390 is shown below. The layout of the terminals, is depicted from the rear.

Fig. 8-2 Rear Terminal Locations (85 - 264 Vac)

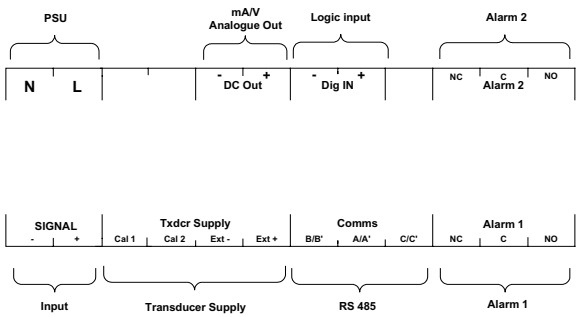


Fig. 8-3 Rear Terminal Locations (24 Vac or Vdc)

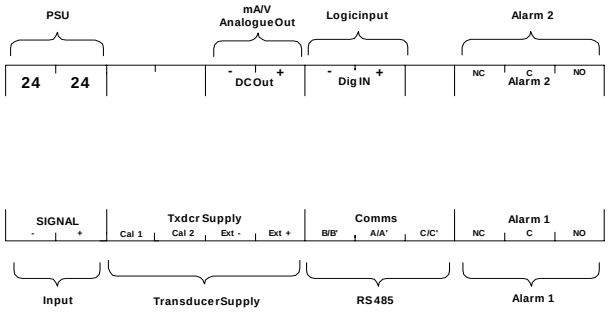
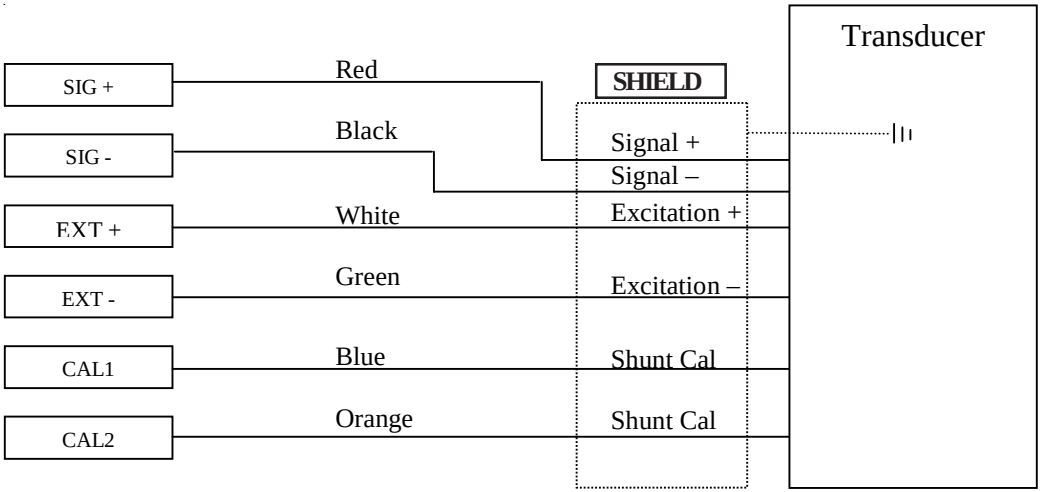


Fig. 8-4 1290 to 1390 Wiring Conversion Table

Terminal	1290 Connection	1390 Connection	Dynisco Transducer Cable Color Code
1	Signal +	Signal +	Red
3	Signal -	Signal -	Black
4	Exc +	Ext +	White
5	Exc -	Ext -	Green
5	Cal1	Cal1	Blue
6	Cal2	Cal2	Orange
7	Logic Input	Dig In +	
8	Logic Input	Dig In -	
9	100/240 VAC	L (Line)	
10	LN (Neutral)	N (Neutral)	
11	Ground	No Connection	
12	AL2	Alarm 2 N.O or N.C	
13	AL2 C	Alarm 2 C	
14	AL1	Alarm 1 N.O or N.C	
15	AL1 C	Alarm 1 C	
18	Remote Enable	N/A	
19	Remote Enable	N/A	
20	A/A'	Comms A/A'	
21	B/B' / mA V+	Comms B/B'	*If using Analog Retrans DC Out +
22	C/C' / mA V -	Comms C/C'	DC Out -

8.1.4 INPUT WIRING

Connect the pressure transducer per the instructions below. Do not run the input wires in the same bundle with the power cables; instead, shielded cable should be used an grounded at the transducer end only (Dynisco's cable assembly provides this grounding).



Dynisco Standard Wiring Code

Lead	Color
Excitation +	White
Signal +	Red
Excitation -	Green
Signal -	Black
Calibration 1	Blue
Calibration 2	Orange

Transducer Pin Out

PT420 Series	PT460 Series
A	C
B	A
C	D
D	B
E	E
F	F
G (Unused)	
H (Unused)	

8.1.5 CONFIGURATION/CALIBRATION MODE

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

For many parameter settings, the display initially alternates between a code and numerical value. Once you start to modify the value, however, only the numerical value will be shown.

When entering a numerical value, ▲ and ▼ are used to increase or decrease the number being entered. The change in value for each step is 1, 10, or 100, depending on the size of the number. The increment is 1 for values up to 2010, 10 from 2010 to 20100, 100 from 20100 to 99900.

8.1.6 CONFIGURABLE PARAMETERS

The following is the complete sequence of configurable parameters. Default values are given on page 30.

A. DISPLAY UNITS

The display shows Un followed by:

PSI = psi
BAR = bar
nPA = MPa
Cn2 = kgf/cm²
OFF = None

B. DECIMAL POINT POSITION

The display shows:

-----	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

B1. Full Scale Readout

The display alternates between **F.S.U.** (Full Scale Value) and a numerical value from 10 to 99900. Only the numerical value will be shown during modification. This value MUST be set equal to the sensor full range, e.g. 10,000 psi.

C. Display Filter Time Constant

The display shows **F.T.C.** (Filter Time Constant) followed by:

.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

D. Input Interrupt

The display shows **I.F.S.** (Input Fail Safe) followed by:

Hi for up scale fail mode, or
Lo for down scale fail mode

E. Shunt Calibration

The display shows **S.C.** (Shunt Calibration) followed by:

On for shunt calibration enabled, or
OFF for shunt calibration disabled
Note: Set shunt calibration to **On** when using Dynisco transducers.

This function is used to test that the indicator is set up correctly.

E1. Shunt Calibration Value

This step is skipped if the shunt calibration is **OFF**. The display alternately shows **Shunt** and a numerical value from 40.0 to 100.0, but only the numerical value will be shown during modification. This value corresponds to the percentage of the Full Scale Value.

Note: When using Dynisco transducers, the Shunt Calibration value should be set to 80.0.

F. External Contact Function

The display shows **E.C.** (External Contact) followed by:

nr to enable external contact for manual alarm reset, via rear digital input terminals or
Ho to enable external contact for hold-on-value sampling

F1. Contact Status

The display shows **C.S.** (Contact Status) followed by:

CL if function selected above is performed with contact closed, or
OP if function selected above is performed with contact open.

G. Alarm 1 Operative Mode

The display shows **A1** (Alarm 1) followed by:

HA High alarm with automatic reset
HL High alarm with manual reset (High Latched Alarm)
LA Low alarm with automatic reset
LL Low alarm with manual reset (Low Latched Alarm)
OFF for no alarm 1

G1. Alarm 1 Action

This step is skipped if Alarm 1 if **OFF**.

The display shows **A1** (Alarm 1) followed by:

rEU for relay energized if no alarm condition (reverse action/fail safe), or
dir for relay energized if alarm condition (direct action).

G2. Alarm 1 Masking Option

This step is skipped if Alarm 1 of **OFF** or **HIGH**.

The display shows **A1** (Alarm 1) followed by:

dIS for masking option disabled, or
Enb for masking option enabled.

This function masks low alarm conditions during start-up until the measured value first becomes greater than the alarm threshold plus hysteresis. The alarm must have been programmed as a low alarm.

G3. Alarm 1 Filter

This step is skipped if alarm 1 is **OFF**.

The display shows **F1** (Filter) followed by:

OFF for no filter on alarm threshold, or
xxx for filter with the time constant chosen in step C above.

G4. Alarm 1 Hysteresis

This step is skipped if alarm is **OFF**.

The display shows **H1** (Hysteresis 1) followed by a value from 0.1 to 9.9. This value corresponds to the percentage of the Full Scale Value.

H. Alarm 2

Follow the same procedure as in steps G-G4 above.

I. Serial Communications Protocol (Option)

The device will support the following protocols:

nbUS for Modbus protocol
JbUS for Jbus protocol

Note: The indicator skips steps I1 and I2 if serial communications is **NOT** implemented (set to **OFF**).

I1. Serial Communication Device Address

The display shows **Adr** (Address) followed by a number ranging from:

1 – 254 for Modbus/Jbus protocol (up to 128 devices per multidrop link)

I2. Serial Communication Baud Rate

The display shows **bd** (Baud Rate) followed by:

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

I3. Serial Communication Byte Format

The display shows **bF** (Byte Format) followed by:

8E for 8 bits with even parity
8O for 8 bits with odd parity
8 for 8 bits with no parity

L. Analog Retransmission (Option)

Note: The indicator skips step L1 to L3 if analog retransmission is NOT implemented.

The display shows **AO** (Analog Output) followed by:

0.20 for 0 – 20 mA
4.20 for 4 – 20 mA
0.10 for 0 – 10 V
0.5 for 0 - 5 V
OFF for retransmission disabled

L1. Analog Retransmission Scaling: Low Scale Value

The display alternately shows **Ar.L.S.U.** (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.

L2. Analog Retransmission Scaling: Full Scale Value

The display alternately shows **Ar.F.S.U**. (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.

L3. Analog Retransmission Filter

The display shows **rF** followed by:

OFF for no filter on retransmitted value, or
xxx for filter having the time constant chosen in step C.

Press **FUNC** to lock in the parameter.

At this point the configuration procedure is complete and the display will return to showing **COnF**.

If necessary, you may now select the analog ouput calibration procedure by pressing ▲. Refer to Analog Output Calibration, below.

When configuration/calibration is complete, press and hold the FUNC button and continue to hold until the unit returns to PV display.

8.1.7 Analog Output Calibration

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

Perform the calibration procedure in accordance with the config settings to select:

- Current Output, calibration parameters C6 and C7
- Voltage Output, calibration parameters C8 and C9

When the display shows **CAL**, you can also load the default parameters, as shown on page 31.

To calibrate the analog retransmission output, connect a multimeter, set to the proper measurement range, to terminals DC out + and - . Press the **FUNC** button to reach desired parameter then make output adjustments by pressing ▲ or ▼ until the signal output measured by the multimeter reaches the proper value. The display only shows the number of counts for the digital to analog converter.

C6 - Retransmission current output minimum value - adjust to 50.0 uA (near zero)
C7 - Retransmission current output minimum value - adjust to 20.0 mA
C8 - Retransmission current output minimum value - adjust to 0.00 Vdc
C9 - Retransmission current output minimum value - adjust to 10.00 Vdc

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

8.2 OPERATING MODE

In this mode the Model 1390 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 only be modified 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 TRANSDUCER INPUT CALIBRATION

You can modify the operating parameters and load default data only when the instrument is unlocked and in local mode. Default values are shown on page 30.

Notes:
1. Transducer/Indicator calibration should be performed with the transducer at operating temperature, and with no pressure applied.

2. The Zero and Full Scale calibrations should be done concurrently.

1. ZERO TRANSDUCER CALIBRATION

Press **FUNC** to enter the calibration mode
The display will show **LO.OFF**
Press the ▲ button once
The display will show **LO.On**
Press the **FUNC** button to perform the zero calibration
The display will blank except for 5 decimal points
After a brief "time out" the unit will enter full scale calibration

Note: In lieu of the ▲ button, pressing the **FUNC** button will advance the indicator to the next parameter.

2. FULL SCALE TRANSDUCER CALIBRATION

The display alternates between **FU.S.C.** and the value of full scale in engineering units.

Press the ▲ button once
The display will show **FU.On**
Press the **FUNC** button to perform the full scale calibration
The indicator automatically returns to operating mode after 6 seconds if no changes are made.

3. TARE CALIBRATION (WEIGHT APPLICATIONS ONLY)

The display alternates between **tArE** and the value of the tare in engineering units. The tare will be forced to zero whenever zero or full scale calibration is performed. At this point there are two options:

a. The perform calibration press ▲
   The display will show **tA**. Followed by:
   OFF to disable calibration
   ON to enable calibration
b. If calibration is not needed, press **FUNC** to go to the next parameter. The instrument automatically returns to operating mode after 6 seconds if no changes are made.

8.2.3 ALARM SET POINTS

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

1. ALARM 1

Press the **FUNC** key four times. 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.

8.2.4 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.

8.2.5 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 **dFOFF,** 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

Parameter	Description	Setting
A	Units	PSI
B	Decimal point position	None
B1	Full scale readout	10000
C	Display filter time constant	400 mS
D	Input interrupt	High
E	Shunt calibration	Enable
E1	Shunt calibration value	80.0%
F	External contact function	Alarm manual reset
F1	Contact status	Closure
G	Alarm 1 operating mode	High with automatic reset
G1	Alarm 1 action	Reverse
G2	Alarm 1 masking option	Disable
G3	Alarm 1 filter	Off
G4	Alarm 1 hysteresis	1.0%
H	Alarm 2 operating mode	High with automatic reset
H1	Alarm 2 action	Reverse
H2	Alarm 2 masking option	Disable
H3	Alarm 2 filter	Off
H4	Alarm 2 hysteresis	1.0%
I	Serial communication type	Off (w/o RS-485) MODbus (w/RS-485)
I1	Serial communication address	1
I2	Serial communication baud rate	19200
I3	Serial communication byte format	8 no parity
L	Analog retransmission type	4 - 20 mA (if fitted)
L1	Analog retransmission low scale value	0.00
L2	Analog retransmission high scale value	10000
L3	Analog retransmission filter	Off

8.3.2 Default Data for Operating Parameters

Parameter	Description	Setting
1	Zero transducer calibration	0 mV
2	Full scale transducer calibration	33.3 mV
3	Tare calibration	0 mV
4	Alarm 1 threshold setting	40% of F.S.V.
5	Alarm 2 threshold setting	60% of F.S.V.
6	Keyboard status	Unlocked

8.3.3 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. MAINTENANCE

9.1 REPAIR

Questions concerning warranty, repair cost, delivery and requests for a RA# should be directed to the Dynisco Repair Department, 508-541-9400 or email: repair@dynisco.com. Please call for a return authorization number (RA#) before returning any product. Damaged instruments should be returned to:

Dynisco Instruments
Attn: RA#_____
38 Forge Parkway
Franklin, MA 02038

Technical Assistance - Please call: 800-221-2201 or 508-541-9400 or fax 508-541-6206

9.2 WARRANTY

The 1390 Series of pressure indicators will provide excellent service and superior performance if proper care is taken during handling, installation, and use. This DYNISCO product is warranted under terms and conditions set forth in the DYNISCO web pages. Go to www.dynisco.com and click “warranty” at the bottom of any page for complete details.

10. 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.

Er 1

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.

Er 6

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.

Er 7

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.

Er 38

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 the 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 failsafe 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.

CE

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.

00000

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.

-0000

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 when the instrument detects an open input on any one of the four or six transducer leads.

11. CE DECLARATION OF CONFORMITY

Declaration of Conformity

DYNISCO LLC 38, Forge Parkway, Franklin, MA 02038. U.S.A.	
Manufacturing site:	**Unit 1, Faraday Close, Worthing, West Sussex, BN13 3RQ, United Kingdom**
Product type:	**Process indicator**
Models:	**1380 Status level A1 and above 1390 Status level A1 and above**
Safety specification:	**EN61010-1**
EMC emissions specification:	**EN61326 Class B**
EMC immunity specification:	**EN61326 Industrial locations**

The manufacturer hereby declares that the above products conform to the safety and EMC specifications listed. The manufacturer further declares that the above products comply with the EMC Directive 89 / 336 / EEC amended by 93 / 68 / EEC, and also with the Low Voltage Directive 73 / 23 / EEC.

Signed: WR Davis Dated: 30.03.04

(William Davis)

CE

IA249986U630 Issue 1 Mar 04

12. APPENDIX A

MODBUS/JBUS COMMUNICATION

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 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.

4. (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).
5. Repeat Steps 3 and 4 until 8 shifts have been performed. When this is done, a complete byte will have been processed.
6. Repeat Steps 2 through 5 for the next byte of the message. Continue doing this until all bytes have been processed.
7. 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.

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 nError 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 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 the common sense suggests to manage 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 over flows 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 Notes:When an error is detected on measure, the"Data field" contains one of these errorcodes: 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)		RDM
125	124	Measure status Range: 0 = Measure normal 1 = Measure in hold		R
*126	125	Peak max value Notes: The openings of the input (E 2) will have influence on the peak value stored in accordancewith programmed failsafe		RDM
*127	126	Peak min value Notes:The openings of the input (E 2) will haveinfluence on the peak value stored in accordancewith programmed failsafe		RDM
128	127	Variation on alarm status 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 8variations on alarm status. The oldest non sent alarm variations are lost		R
129	128	Status alarm 1 Range: 0 = No alarm 1 = Alarm		R

Jbus Address	MODbus Address	Description	Display Code	Attribute
130	129	Status alarm 2 Range: 0 = No alarm 1 = Alarm		R
*131	130	Alarm 1 threshold		RWDM
*132	131	Alarm 2 threshold		RWDM
133	132	Tare calibration value	(“tARE”)	RDM
134	133	Input variable without filter Notes: When an error is detected on measure, the”Data field” contains one of these errorcodes: 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)		RDM
*218	217	Lock/unlock device status Range: 0 = Unlock device 1 = Lock device		RW
*219	218	Local/remote device status Range: 0 = Device in local 1 = Device in remote Notes:See note 6 at page 43.		RW
220	219	Unsolicited request flag Range: 0 = No Parameters change is occurred 1 = change is occurred on parameters marked with *Notes: The word is set at the start-up. Changes produced by serial link will not beflagged. The word resets after reading.		R
221	220	Zero transducer calibration Range: 0 = Disable calibration 1 = Enable calibration	(“Lo”)	W

Jbus Address	MODbus Address	Description	Display Code	Attribute
222	221	Full scale transducer calibration Range: 0 = Disable calibration 1 = Enable calibration	(“Fu.S.C.”)	W
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 Range: 0 = No operation 1 = Peak reset		W
226	225	Manual reset of alarm 1 condition Range: 0 = No operation 1 = Reset alarm 1		W
227	226	Manual reset of alarm 2 condition Range: 0 = No operation 1 = Reset alarm 2		W
228	227	Load default control parameters value Range: 0 = No operation 1 = Load default Notes:Refer to device manual for listing of default value.		W

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.V.”)	RDM
263	262	Multiplier 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		R
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.tc”)	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
266	265	Shunt calibration Range: 0 = Shunt calibration disabled (Off) 1 = Shunt calibration enabled (On)	(“S.C.”)	R
267	266	Shunt calibration value	(“Shunt”)	RD
268	267	Number of decimal figures related to: Shunt calibration value		R
269	268	External contact function Range: 0 = Enable external contact for manual alarmreset (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

2

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

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

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