DYNALCO

Catalyst Monitor

6-Channel Monitor

Installation and Operation Manual

Rev. F

System Overview

The Dynalco Catalyst Monitor is designed to address the RICE NESHAP mandate regarding continuous monitoring of catalyst inlet temperature and differential pressure on both spark-ignited and diesel engines. It is capable of reading up to 6 input channels, calculating differential values, providing alarm / shutdown outputs as well as allowing all parameters to be logged to an internal flash memory. An RS-485 Modbus link for communications to a DCS or PLC is also provided.

Additionally, the Catalyst Monitor is capable of calculating the engine catalyst inlet temperature based on a 4 hour rolling average per RICE NESHAP requirements.

Basic operation:

The Catalyst Monitor will be in "stopped" mode until a run indication is sensed. This is selectable as either a contact closure or magnetic pickup input. Once "running" mode is sensed, the Catalyst Monitor will read all inputs at a rate of 100 msec per channel. If any input crosses either an over or under threshold, the unit will invoke a flashing red LED on the front panel as well as an output trip (solid-state relay) that can be used for alarm or shutdown. Any trips will also cause the Catalyst Monitor to date / time stamp whenever a trip threshold is crossed. The monitor will log the last (10) events for each channel input.

Data Logging:

The Catalyst Monitor also allows data logging of any monitored values where they will be saved to an internal flash memory. Memory is sufficient to hold up to 500,000 data values with date / time stamp. These values can be downloaded at any time to a PC using Dynalco's download cable and Log Reader software.

Additional Features

- 5 - Digit Hourmeter Function (non-resettable)

- Engine RPM Display

- Fully programmable from front keypad

- ¼ DIN package (3 ½" width X 3 ½" height) for panel mount

Specifications

| Input Types	J or K type thermocouple (ungrounded) accurate to +/- 0.2 % 4 - 20 mA 0 – 1 VDC 0 - 5 VDC 0 – 10 VDC
Digital Input	Closure to ground indicates run condition (or use pulsed input)
Pulsed Input	Magnetic pickup input for RPM display & to indicate run condition
Relay Outputs	2 Digital Outputs rated @ 0.15 A / 48 VDC
Input Power	10 – 36 VDC
Display	Backlit Graphic Display
Data Logging	Internal Flash Memory to retain data logged values w/ date & time stamp
Communications	Modbus
Connections	Two-Part Terminal Blocks
Operating Temperature Range	- 40 to + 70 Deg C
Certification	CSA Class I, Division 2, Groups A, B, C, D

User Interface

The Catalyst Monitor is configured via the keypad on the front panel which includes a graphical backlit LCD display capable of displaying alpha numeric values and custom engineering units of measure. The keypad implements a menu system, which is navigated using the up, down, left, right, enter and escape buttons. The backlight will turn off after five minutes of inactivity and will turn on when any of the keys are pressed.

Installation:

The Catalyst Monitor is a standard ¼ DIN package, designed to be panel mounted. The cutout dimensions are shown below.

MOUNTING OPENING
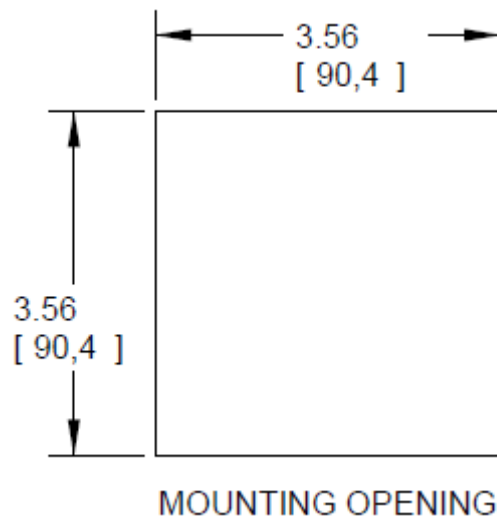
The Catalyst Monitor has integral mounting clips for securing into the panel. The following drawings illustrate the mounting procedure.
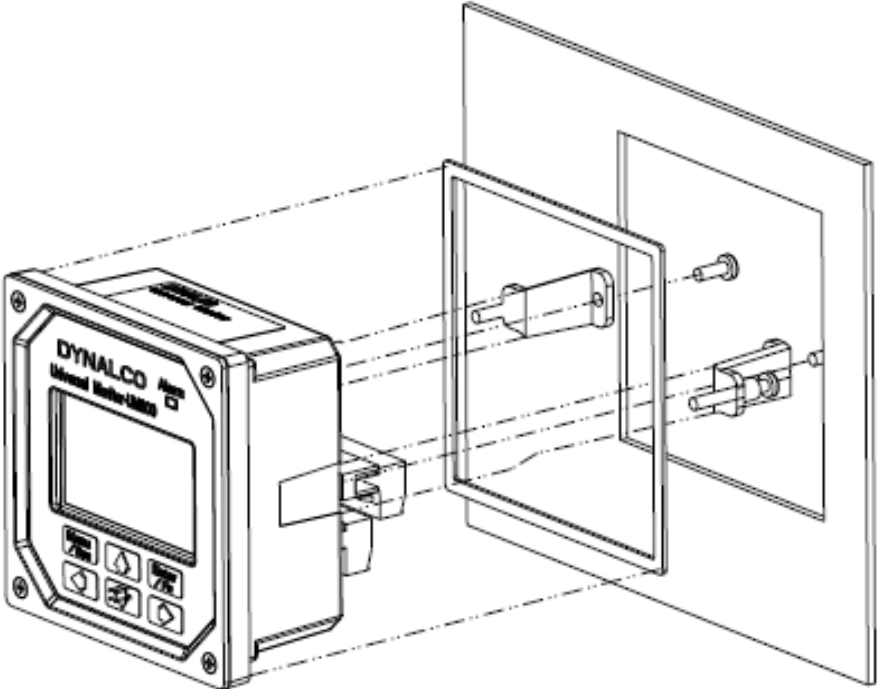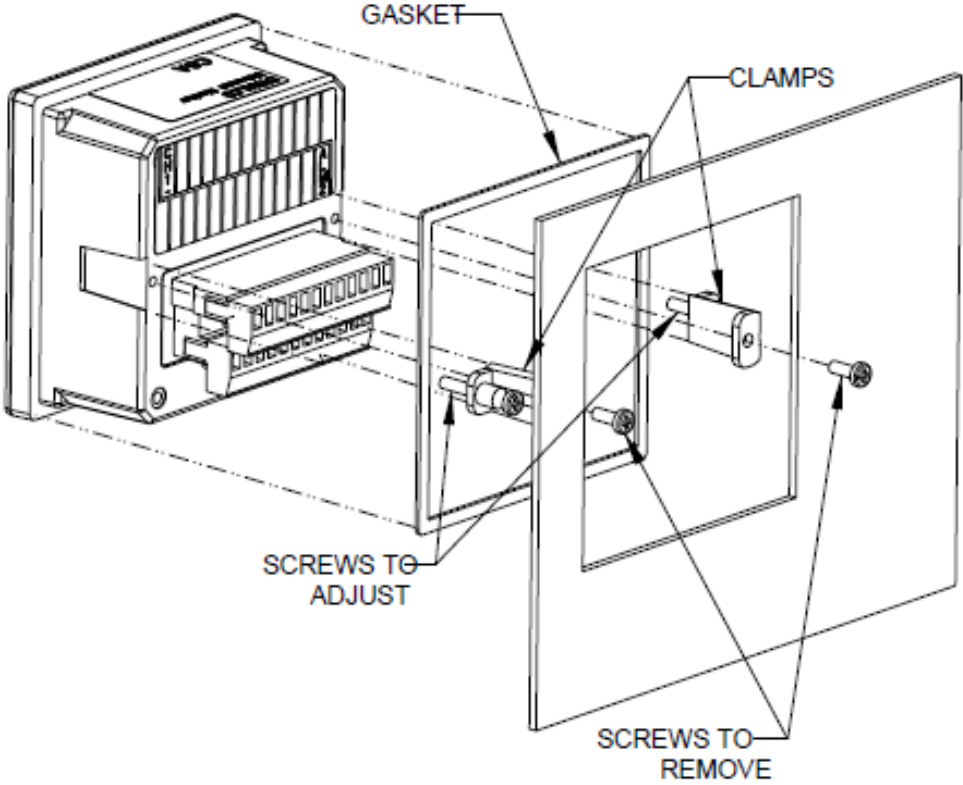
Terminal Connections

All connections are made via the removable connectors on the back of the unit.

PIN	Description
1	GND (Power Gnd)
2	VIN (10 - 36 VDC input)
3	GND (mag pickup input)
4	RPM + (mag pickup input)
5	Receive Data (-)
6	Receive Data (+)
7	Transmit Data (-)
8	Transmit Data (+)
9	Alarm 1
10	Alarm 1
11	Alarm 2
12	Alarm 2

PIN	Description
13	Channel 1 (-)
14	Channel 1 (+)
15	Channel 2 (-)
16	Channel 2 (+)
17	Channel 3 (-)
18	Channel 3 (+)
19	Channel 4 (-)
20	Channel 4 (+)
21	Channel 5 (-)
22	Channel 5 (+)
23	Channel 6 (-)
24	Channel 6 (+)

Also used for USB download cable assembly p/n 270A-13020 (see page 13)

TERMINAL 13

TERMINAL 1
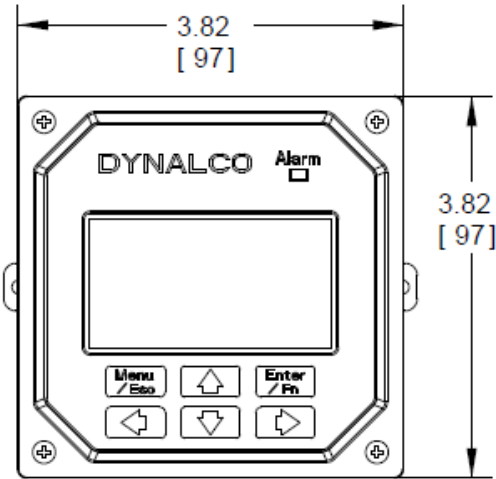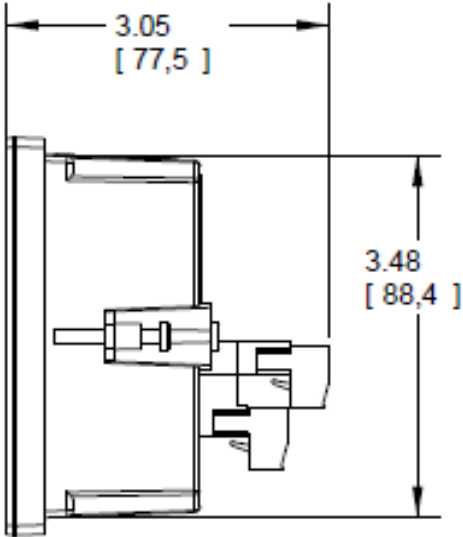
TERMINAL 24

TERMINAL 12
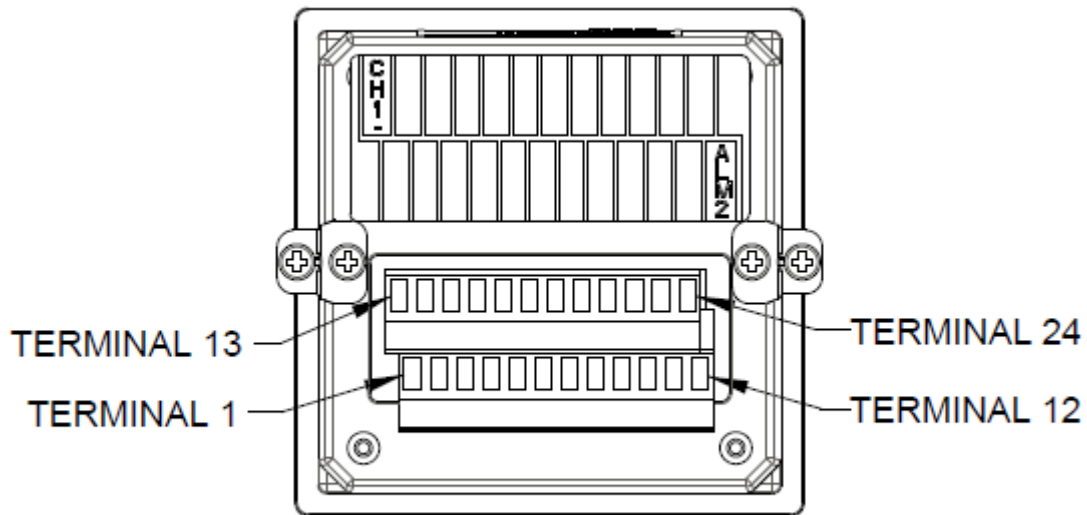
BACK VIEW

Outline Dimensions
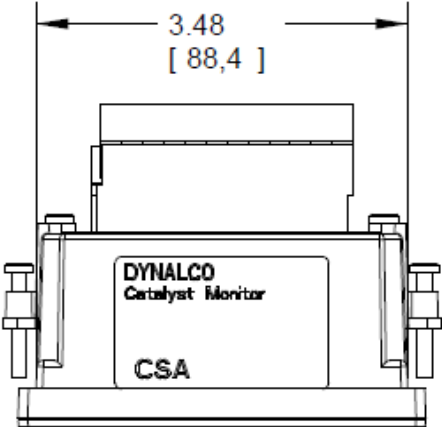
TOP VIEW

FRONT VIEW

SIDE VIEW

Programming Overview

All programming is accomplished through the front keypad. Below is a brief description of each key.

Menu /Esc   Press to enter or exit the configuration screens

Enter /Fn   Press to enter or accept values

▲   Select up

▼   Select down

◄   Go back one screen

►   Select and advance to next screen

Initial configuration consists of the following steps:

1) Setting current date / time

2) Enabling each input

3) Defining each input type

4) Defining min. & max. display values for any current or voltage inputs

5) Defining measurement display units (PSI, mV, F, C, H20, etc)

6) Setting over / under setpoint trips

7) Selecting either output 1 or output 2 (or both) for alarm trips

8) Setting either latching or non-latching for output trips

9) Defining data logging events

Programming Instructions

Important: **The Catalyst Monitor must first be programmed prior to operation.**

When initially powering up the unit, the display will first indicate the firmware version and then go to the operational mode. It may also display a screen warning that the time & date need to be entered. This will be explained below.

To configure the Catalyst Monitor, first go to the main programming screen by pressing the Menu / Escape key:

Menu /Esc

The main configuration screen appears as:

CHANNEL SETTINGS

The various icons are described as:

	System	- allows display customization & current date / time input
	Run Signal	- defines run status input type (if any)
	Channel	- enables each channel type and alarm thresholds
	Calibration	- defines zero & span values for DCV & mA inputs
	Alarm Logs	- allows the user to view alarm status
	Communication	- Modbus setup
	Data Log	- allows configuration of up to (10) different logging events

"System" Configuration ✖

Using the arrows on the keypad, select the "System" icon.

There are (3) display layouts available. Selecting layout A, B or C will define the preferred display type as follows:

Layout A: Displays groups of (2) input channels plus differential.
Layout B: Displays all inputs as bar graph plus each individual channel.
Layout C: Displays each individual channel in large format.

Note that you are selecting the underline default layout type. You will be able to change the layout during normal operation by pressing the left / right arrows.

Important: *The current underline date and time are also programmed through the "System" icon. This is critical for proper alarm and data log information. Please note also that the date and time may need to be re-programmed if the Catalyst Monitor loses input power for over 1 week. This will be indicated by a warning upon powering up the unit.*

Any data logged to the internal flash memory will be held indefinitely even if power lost.

Configuration of "Run Signal" ⚙

Using the arrows on the keypad, select the "Run Signal" icon.

There are (3) run types available. The definitions are as follows:

None: No run indication required. Monitoring is always active.
RPM: Monitoring is active when signal received from magnetic pickup.
Digital: Monitoring is active when contact closure (connection to ground) is sensed.

To select run signal type, use the up / down arrows to select, then press the right arrow to accept and advance to the next screen.

If **"None"** is selected, there is no other action required other than to select "escape." After selecting escape, you will be asked to select "yes" to save.

If **"RPM"** is selected, you will need to set the # gear teeth, RPM threshold and startup delay. The RPM threshold is the speed above which monitoring will be active. The startup delay allows you to delay monitoring for as many as 300 seconds (5 minutes) to allow time for all inputs to be at normal levels. If no delay is required, set to 0 seconds. The magnetic pickup input terminals are indicated on page 4.

If **"Digital"** is selected, you will only need to set the startup delay (if applicable). In this mode, a run signal will be sensed with a contact closure (or short) between the magnetic pickup input terminals indicated on page 4.

Pressing [Menu/Esc] **at any time during configuration will prompt you to save the changes. Select "Yes" to save any changes made. Selecting "No" will not save changes.**

Configuration of each "Channel"

Using the arrows on the keypad, select the "Channel" icon.

Next, select the channel number to configure by pressing the up / down arrows, then pressing the right arrow to navigate and select the following:

Enable Channel   (Yes / No)
Channel Type   (0-1 V, 0-5 V, 0-10 V, 4-20 mA, J Type, K Type)
Description   (name input with up to 20 characters)
Engineering Units   (up to 3 characters, for example: PSI, mV, F, C etc…)
            Note: *For thermocouple inputs, you must enter either "F" or "C"*
Enable alarms   (read only or alarm?)
Alarm Type   (latching or non-latching?)
Alarm Output   (select output #1, output #2 or both)
Alarm Low   (select threshold for under-trip)
Alarm High   (select threshold for over-trip)
Alarm Reset Points   (select either the default reset value or manually set)
Alarm Reset Low   (manually set reset hysteresis for low trip)
Alarm Reset High   (manually set reset hysteresis for high trip)

Differential calculations between channels 1&2, 3&4, 5&6 are also enabled by selecting the "Channel" icon. Enable "Differential 1" for channels 1&2, "Differential 2" for channels 3&4 and "Differential 3" for channels 5&6.

Configuration of "Calibration"

Using the arrows on the keypad, select the "Calibration" icon.

Next, select the channel number to configure by pressing the up / down arrows and pressing the right arrow to select and continue.

The screens allow you to define the "Cal Zero" and "Cal Span" values for any channels that are configured for 0-1 V, 0-5 V, 0-10 V or 4-20 mA inputs.

> *Example*
>
> *A pressure transmitter is connected to channel # 1. The transmitter has a 4-20 mA output representing a pressure input of 0 - 500 PSI. The "Cal Zero" and "Cal Span" values would be defined as:*
>
> > *Cal Zero = 0*
> > *Cal Span = 500*
>
> *Note that the "Engineering Units" would be input as PSI in "Channel" configuration above.*

Alarm Logs 🔔

Selecting "Alarm Logs" will allow the following (2) options:

Show Active alarms:
- displays any active alarms & date / time information
- active alarms may be acknowledged by pressing "enter"
- once an alarm is acknowledged, it is placed into historical memory (see below)

Show All alarms
- shows historical data (last 10 alarms) for each channel with date / time stamp

Operation

Once programmed, the Catalyst Monitor will begin scanning all enabled channel inputs and will initiate alarms based on over / under threshold values configured for each channel. It is not necessary to define alarm threshold values for all channels as some may be for monitoring only.

Alarm Outputs

The Catalyst Monitor will alarm when channel values or differential values are above or below limits as specified. Alarms can be configured as either latching or non-latching. If an alarm condition is met, the red LED on the front panel will blink and the digital output(s) will trip. The alarm point name (ch1, ch2, df1, df2) that caused the alarm will be stored in memory with date/time stamp info. Non-latching alarms will reset the alarm if its value returns to normal. Latching alarms require manual resetting via the front keypad.

Selecting the alarm 🔔 icon will allow you to view any active alarms as well as the history log for each channel. Once an active alarm is acknowledged, it will be placed into the history log. The history log will continuously store the last 10 alarms for each channel as well as the time & date of each alarm occurrence.

Catalyst Inlet Temperature Monitoring (per RICE NESHAP requirements)

The Catalyst Monitor will allow you to configure any one channel to monitor the catalyst inlet temperature based on a 4 hour rolling average per the RICE NESHAP mandate. To set this up, first go to the main menu, then select "System." Go to the right until you see the screen named "Enable EPA Average." Selecting "Enable" will bring you to the next screen allowing you to select which channel is monitoring the catalyst inlet temperature. Please note that once this is configured, the channel representing the catalyst inlet temperature will always display the 4 hour average, not instantaneous exhaust temperature. This temperature is only updated every 15 minutes per NESHAP requirements.

Following this, selecting the "Channel" icon in the main menu screen will allow over and under temperature alarms to be set according to the mandate.

Data logging of the inlet temperature values is explained in the next section.

Data Logging 📄

Configuration:

The Catalyst Monitor can be configured to log any of the parameters being monitored, at user defined time intervals. The values are saved to an internal flash memory with sufficient memory to hold up to 500,000 data values with date / time stamps. These values can be downloaded at any time to a PC using Dynalco's "Log Reader" software.

The logging of any parameter is configured as an event. The Catalyst Monitor will allow up to (10) individual events to be defined.

For the RICE NESHAP requirement, the catalyst inlet temperature (based on the 4 hour rolling average) is to be logged at 15 minute intervals while the engine is running. An event can be configured to comply with this mandate.

It's also possible to configure another event that will log the catalyst differential pressure at defined intervals. Note that some users may decide to manually record this value once per month since the engine needs to be fully loaded.

Example # 1:

To configure data logging of <u>catalyst inlet temperature</u> every 15 minutes:

Using the arrows on the keypad, select the "Data Log" icon.

Next, select "Setup Log Events" and press the ▶ arrow.

The next screen will display a list of (10) events that can be configured. If this is the first event to be programmed, select "Event 1" and press the ▶ arrow.

Next select "Enable" and press the ▶ arrow.

The next screen allows you to define an "On" condition. The configuration for logging the inlet temperature does <u>not</u> require this since the "On" condition is normally defined by an "engine run" signal. See above (page 8) for the procedure for configuring the "run" signal. In this case, select "No" and press the ▶ arrow.

The next screen named "Input To Log" allows the user to select which parameter to log. Using the up / down arrows, select the input channel that is set up to monitor the catalyst inlet temperature. Press ▶ arrow.

The next screen named "Log Frequency" allows the configuration of how often (in minutes) the value is to be logged. Press enter and edit for 15 minutes. Selecting escape 🔘 will return to the "Log Frequency" screen. Press the ▶ arrow and then select "Yes" to save the changes. Pressing the escape 🔘 key two times will escape to the normal monitoring mode.

Example # 2:

To configure data logging of <u>catalyst differential pressure</u> after engine warm up:

(Note that this configuration will require an input signal from a magnetic pickup to sense engine running.)

Using the arrows on the keypad, select the "Data Log" icon.

Next, select "Setup Log Events" and press the ▶ arrow.

The next screen will display a list of (10) events that can be configured. If this is the second event to be programmed, select "Event 2" and press the ▶ arrow.

Next select "Enable" and press the ▶ arrow.

The next screen allows you to define an "On" condition. The configuration for logging the differential pressure will require an "On" condition defined by an "engine run" signal. See above (page 8) for the procedure for configuring the "run" signal. In this case, select "Yes" and press the ▶ arrow.

Select "Edit Compare" on the next screen and press the ▶ arrow.

Select "Compare 1" on the next screen and press the ▶ arrow.

Select "RPM" on the next screen and press the ▶ arrow.

Select "Greater Than" on the next screen and press the ▶ arrow.

Select "A Value" on the next screen and press the ▶ arrow.

On the following screen, select an RPM value that will indicate engine running. This value should be lower than the normal engine running speed and higher than the RPM defined as the "run" signal in page 8.

The next screen will ask if you want to "Edit Another?" Select "no" and press the ▶ arrow.

Press the ▶ arrow (3) more times until the screen appears as "Enter ON Delay." Enter this number as the time delay (in seconds) following engine start when you would like to log the catalyst differential pressure. The maximum value configurable is 3600 seconds (60 minutes.) After entering the time delay, press ▶ arrow.

The next screen allows you to define an "Off" condition. In this case, select "No" and press the ▶ arrow.

The next screen named "Input To Log" allows the user to select which parameter to log. Using the up / down arrows, select the input that is defined as the catalyst differential pressure. Press ▶ arrow.

The next screen named "Log Frequency" allows the configuration of how often (in minutes) the value is to be logged. Entering 0 minutes will allow only (1) data log event following the start delay. If you wanted to continuously log the differential pressure, you would select the frequency in minutes between data logs. Selecting escape ▣ will return to the "Log Frequency" screen.

Press the ▣ arrow and then select "Yes" to save the changes.

Pressing the escape ▣ key two times will escape to the normal monitoring mode.

IMPORTANT NOTICE REGARDING POWER INTERRUPTION:

If input power to the Catalyst Monitor is disconnected or lost during a data log operation, there is a possibility of losing the last few values stored.

To prevent this, it is important to turn off the data logging prior to power disconnect. This is accomplished through the "Data Logging" icon on the main menu. When this is selected, the first screen will allow you to select "Stop Logging." Pressing the ▣ arrow will provide instructions for a safe power down.

The data logging will be enabled automatically when power is re-applied.

Downloading logged values to PC:

The hardware connection from the Catalyst Monitor to a PC is via a USB cable assembly, Dynalco p/n 270A-13020. The 6 ft cable length allows easy connection via a 4 pin Phoenix plug to the lower connector (terminals 5, 6, 7, 8) on the back of the Catalyst Monitor.

The Dynalco host software is available as a free download from our website. Please call (954) 739-4300 if assistance is required in locating this file.

Following installation, you may click on the icon to open the application. This software will allow date selectable log values to be downloaded to an excel spread sheet on the PC.

Communication

The unit also provides access to the internal registered values using the Modbus Protocol. The diagram below shows the recommended connections to the removable connectors on the back of the unit for either half-duplex or full-duplex (RS485).

Wiring is as follows:

PIN	Description
5	TD(A) **
6	TD(B) **
7	Jumper to PIN 5
8	Jumper to PIN 6

** A 120 ohm termination resistor may need to be installed across pins 5 & 6.
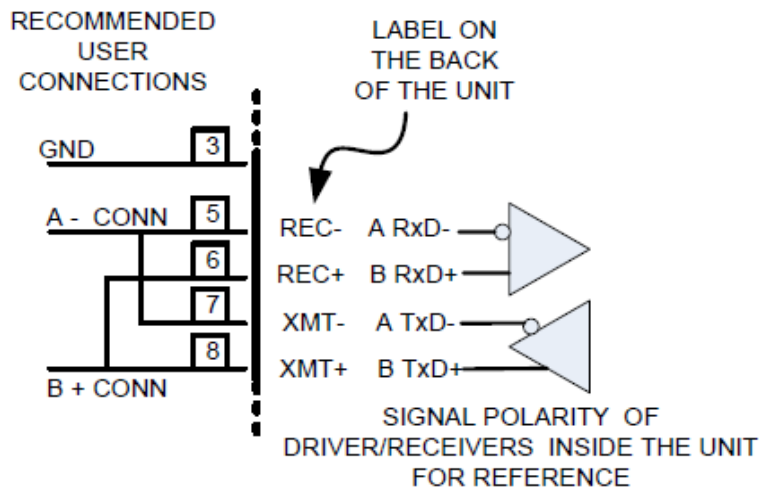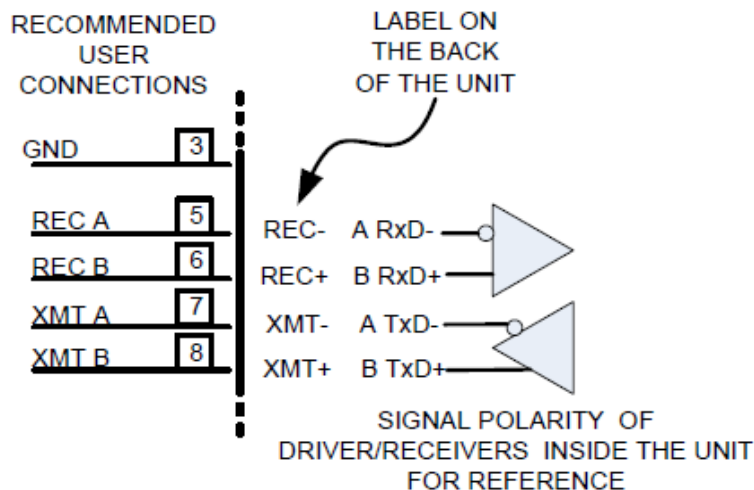
Modbus Address Registers:

The Modbus address registers are defined in the tables below.

Input Register Table (table 1)

Modicon Address	Modbus Offset	Description	Min Value	Max Value	Scale	Data type
300001	0	Status Register				Bit mask
		Bit 0 - Channel 1 Alarm	0	1		0001h
		Bit 1 - Channel 2 Alarm	0	1		0002h
		Bit 2 - Channel 3 Alarm	0	1		0004h
		Bit 3 - Channel 4 Alarm	0	1		0008h
		Bit 4 - Channel 5 Alarm	0	1		0010h
		Bit 5 - Channel 6 Alarm	0	1		0020h
		Bit 6 - Channel 1-2 Differential Alarm	0	1		0040h
		Bit 7 - Channel 3-4 Differential Alarm	0	1		0080h
		Bit 8 - Channel 5-6 Differential Alarm	0	1		0100h
		Bit 9 - Unused	0	1		0200h
		Bit 10 - Unused	0	1		0400h
		Bit 11 - Unused	0	1		0800h
		Bit 12 - Unused	0	1		1000h
		Bit 13 - Unused	0	1		2000h
		Bit 14 - Unused	0	1		4000h
		Bit 15 - Running (Armed)	0	1		8000h
300002	1	Channel 1 Value	-32768	32767		Signed 16 bit integer
300003	2	Channel 2 Value	-32768	32767		Signed 16 bit integer
300004	3	Channel 3 Value	-32768	32767		Signed 16 bit integer
300005	4	Channel 4 Value	-32768	32767		Signed 16 bit integer
300006	5	Channel 5 Value	-32768	32767		Signed 16 bit integer
300007	6	Channel 6 Value	-32768	32767		Signed 16 bit integer
300008	7	Channel 1 and 2 Differential Value	-32768	32767		Signed 16 bit integer
300009	8	Channel 3 and 4 Differential Value	-32768	32767		Signed 16 bit integer
300010	9	Channel 5 and 6 Differential Value	-32768	32767		Signed 16 bit integer
300011	10	Channel 1 High Alarm Limit	-32768	32767		Signed 16 bit integer
300012	11	Channel 2 High Alarm Limit	-32768	32767		Signed 16 bit integer
300013	12	Channel 3 High Alarm Limit	-32768	32767		Signed 16 bit integer
330014	13	Channel 4 High Alarm Limit	-32768	32767		Signed 16 bit integer
300015	14	Channel 5 High Alarm Limit	-32768	32767		Signed 16 bit integer
300016	15	Channel 6 High Alarm Limit	-32768	32767		Signed 16 bit integer
330017	16	Channel 1 and 2 Differential High Alarm Limit	-32768	32767		Signed 16 bit integer
300018	17	Channel 3 and 4 Differential High	-32768	32767		Signed 16 bit integer

		Alarm Limit				
300019	18	Channel 5 and 6 Differential High Alarm Limit	-32768	32767		Signed 16 bit integer
300020	19	Channel 1 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300021	20	Channel 2 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300022	21	Channel 3 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300023	22	Channel 4 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300024	23	Channel 5 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300025	24	Channel 6 Low Alarm Limit	-32768	32767		Signed 16 bit integer
300026	25	Channel 1 and 2 Differential Low Alarm Limit	-32768	32767		Signed 16 bit integer
300027	26	Channel 3 and 4 Differential Low Alarm Limit	-32768	32767		Signed 16 bit integer
300028	27	Channel 5 and 6 Differential Low Alarm Limit	-32768	32767		Signed 16 bit integer
300029	28	RPM	0	65535		Unsigned 16 bit integer
300030	29	Hour meter	0	65535		Unsigned 16 bit integer
301002-301005	1001-1004	Log Buffer Entry #1				Custom (See table 4)
301006-301009	1005-1008	Log Buffer Entry #2				Custom (See table 4)
301010-301013	1009-1012	Log Buffer Entry #3				Custom (See table 4)
301014-301017	1013-1016	Log Buffer Entry #4				Custom (See table 4)
301018-301021	1017-1020	Log Buffer Entry #5				Custom (See table 4)
301022-301025	1021-1024	Log Buffer Entry #6				Custom (See table 4)
301026-301029	1025-1028	Log Buffer Entry #7				Custom (See table 4)
301030-301033	1029-1032	Log Buffer Entry #8				Custom (See table 4)
301034-301037	1033-1036	Log Buffer Entry #9				Custom (See table 4)
301038-301041	1037-1040	Log Buffer Entry #10				Custom (See table 4)
301042-301045	1041-1044	Log Buffer Entry #11				Custom (See table 4)
301046-301049	1045-1048	Log Buffer Entry #12				Custom (See table 4)
301050-301053	1049-1052	Log Buffer Entry #13				Custom (See table 4)

301054-301057	1053-1056	Log Buffer Entry #14				Custom (See table 4)
301058-301061	1057-1060	Log Buffer Entry #15				Custom (See table 4)
301062-301065	1061-1064	Log Buffer Entry #16				Custom (See table 4)
301066-301069	1065-1068	Log Buffer Entry #17				Custom (See table 4)
301070-301073	1069-1072	Log Buffer Entry #18				Custom (See table 4)
301074-301077	1073-1076	Log Buffer Entry #19				Custom (See table 4)
301078-301081	1077-1080	Log Buffer Entry #20				Custom (See table 4)
301082-301085	1081-1084	Log Buffer Entry #21				Custom (See table 4)
301086-301089	1085-1088	Log Buffer Entry #22				Custom (See table 4)
301090-301093	1089-1092	Log Buffer Entry #23				Custom (See table 4)
301094-301097	1093-1096	Log Buffer Entry #24				Custom (See table 4)
301098-301101	1097-1100	Log Buffer Entry #25				Custom (See table 4)
301102-301105	1101-1104	Log Buffer Entry #26				Custom (See table 4)
301106-301109	1105-1108	Log Buffer Entry #27				Custom (See table 4)
301110-301113	1109-1112	Log Buffer Entry #28				Custom (See table 4)
301114-301117	1113-1116	Log Buffer Entry #29				Custom (See table 4)
301118-301121	1117-1120	Log Buffer Entry #30				Custom (See table 4)

Holding Register Table (table 2)

Modicon Address	Modbus Offset	Description	Min Value	Max Value	Scale	Data type
401001-401002	1000-1001	Log start date (upper 16 bits and lower 16 bits respectively)				Custom (See table 3)

Date Format Table (table 3)

	Second(MSB)	Minute	Hour	Day	Month	Year(LSB)
Bits	6	6	5	5	4	6
Value range	0-59	0-59	0-23	1-31	1-12	0-63(relative to year 2000)

Log Buffer Entry (table 4)

	Date Time	Event ID	Value
Length	4 bytes	2 bytes	2 bytes
Value range	see table 3	1-10	0-65535

WARNING:
1. SUBSTITUTION OF COMPONENTS MAY IMPAIR DIVISION 2 CERTIFICATION.
2. WHEN USED IN DIVISION 2, DO NOT DISCONNECT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS
3. MAXIMUM AMBIENT TEMPERATURE +70 C (+158 F).
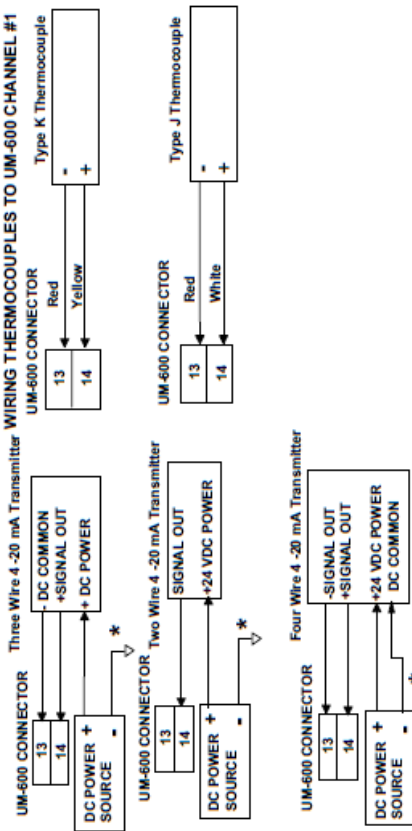
UM-600 MONITOR OR CATALYST MONITOR

TOP ROW

Terminal	
13	Channel 1 (-)
14	Channel 1 (+)
15	Channel 2 (-)
16	Channel 2 (+)
17	Channel 3 (-)
18	Channel 3 (+)
19	Channel 4 (-)
20	Channel 4 (+)
21	Channel 5 (-)
22	Channel 5 (+)
23	Channel 6 (-)
24	Channel 6 (+)

CHANNEL #1 ANALOG INPUT - +
CHANNEL #2 ANALOG INPUT - +
CHANNEL #3 ANALOG INPUT - +
CHANNEL #4 ANALOG INPUT - +
CHANNEL #5 ANALOG INPUT - +
CHANNEL #6 ANALOG INPUT - +

BOTTOM ROW

Terminal	
1	Power Ground (-)
2	Power In (+)
3	Ground (-)
4	RPM (+)
5	Receive Data (-)
6	Receive Data (+)
7	Transmit Data (-)
8	Transmit Data (+)
9	Alarm 1
10	Alarm 1
11	Alarm 2
12	Alarm 2

10 - 36 VOLT DC POWER SOURCE - +
RPM INPUT (SEE NOTE 1)
RS - 485 COMMUNICATIONS TERMINAL
NOTE 2
NOTE 3
LOAD 0.200 AMPS MAXIMUM
LOAD 0.200 AMPS MAXIMUM
10 - 48 VOLT DC POWER SOURCE
10 - 48 VOLT DC POWER SOURCE

NOTES:
1. The M201, M202, M231, M233, M928, and M928-24 Magnetic Pickups have been approved to be connected to the RPM input. The pickup must be connected with shielded cable with the shield connected to terminal 3 as shown. As an alternative, a contact closure may be connected to the RPM input as a "RUN" signal.
2. The unit is powered by 10 - 36 Volt DC at 0.15 Amp max. DC power wiring must be run in CSA approved solid or flexible conduit.
3. The Alarm outputs may be connected to a load not to exceed 48 Volt DC and 0.2 Amps. Alarm output wiring must be run in CSA approved solid or flexible conduit.
4. The UM-600 and Catalyst Monitor are certified for mounting in a suitable enclosure. Suitability of the final combination is to be determined by CSA or the inspection authority having jurisdiction.
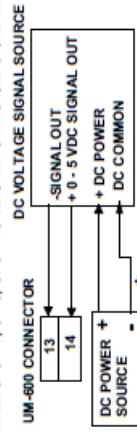
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DO NOT SCALE THE DRAWING

Wiring diagrams below are shown for Channel #1. Channels 2 thru 6 will be wired in a similar manner.

WIRING 4- 20 mA TRANSMITTERS TO UM-600 CHANNEL #1
WIRING THERMOCOUPLES TO UM-600 CHANNEL #1

Three Wire 4-20 mA Transmitter
UM-600 CONNECTOR
13 — DC COMMON
14 — +SIGNAL OUT / + DC POWER
DC POWER SOURCE + -

Type K Thermocouple
UM-600 CONNECTOR
13 — Red
14 — Yellow — +

Two Wire 4 -20 mA Transmitter
UM-600 CONNECTOR
13 — SIGNAL OUT
14 — +24 VDC POWER
DC POWER SOURCE + -

Type J Thermocouple
UM-600 CONNECTOR
13 — Red
14 — White — +

Four Wire 4 -20 mA Transmitter
UM-600 CONNECTOR
13 — -SIGNAL OUT
14 — +SIGNAL OUT / +24 VDC POWER / DC COMMON
DC POWER SOURCE + -

WIRING 0 - 1, 0 - 5, or 0 - 10 VDC INPUT TO UM-6 CHANNEL #1
DC VOLTAGE SIGNAL SOURCE
UM-600 CONNECTOR
13 — -SIGNAL OUT / 0 - 5 VDC SIGNAL OUT
14 — + DC POWER / DC COMMON
DC POWER SOURCE + -

* 0 - 1, 0 - 5, 0 -10 VDC and 4/20 Milliamp Transmitters must be powered by a power supply which has the same common (-) as the power to the UM-600 Monitor.

4/20 Milliamp and 0 - 5 Volt Transmitters connected to the UM-600 Monitor must be approved for use in Class I, Division 2, Groups A, B, C, & D areas.

Any ungrounded thermocouple may be connected to the UM-600 Monitor as the thermocouple input circuit has been evaluated as non-incendive.

THE UM-600 AND CATALYST MONITOR ARE CSA APPROVED FOR USE IN CLASS I, DIVISION 2, GROUP A, B, C, & D LOCATIONS WHEN INSTALLED PER INSTRUCTIONS ON THIS DRAWING.

DYNALCO CONTROLS — FT. LAUDERDALE, FL, USA

DRAWN	D. A. Weaver
DATE	01/13/11
PRODUCT/PART	UM-600
TITLE	CATALYST MONITOR

INTERCONNECTION DRAWING
CSA APPROVED UNITS

SIZE: A
DRAWING NUMBER: 80012970
PAGE 1 OF 1
REV —

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE:
FRACT. ±1/64   DEC. XXX ±.005 / XX ±.01   ANGLES ±1/2 DEGREE

MATERIAL:
FINISH:
SCALE:

REVISIONS

LTR	DESCRIPTION	DATE	APPD