

PROPLUS Batch Controllers

YPP6210 Analog Input & YPP6310 Pulse Input



PROPLUS



- YPP6210: 0-20 mA, 4-20 mA, 0-5 V, 1-5 V, ± 10 V Inputs
- YPP6310: Pulse, Open Collector, NPN, PNP, TTL, Switch Contact Sine Wave (Coil), Square Wave Inputs
- NEMA 4X, IP65 Front
- Sunlight Readable Display Models
- Start/Pause/Stop, Change Batch with Front Panel Buttons
- Single or Multi-Stage Batch Control (Up to 8 Relays)
- Automatic Overrun Correction
- Rate in Units per Second, Minute, Hour, or Day
- Automatic or Manual Batch Control
- Low or High Flow Alarms
- 9 Digit Grand Total with Overflow Feature
- Count Up or Down with Each Batch
- Free **PROPLUS** Software for Operation, Monitoring, and Programming

YOKOGAWA



2 Dart Road • Newnan, Georgia 30265

770-253-7000 • 800-888-6400

Fax: 770-251-2088 • www.yokogawa-usa.com

Disclaimer

The information contained in this document is subject to change without notice. Yokogawa Corporation of America makes no representations or warranties with respect to the contents hereof; and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.



CAUTION: Read complete instructions prior to installation and operation of the controller.



WARNING: Risk of electric shock or personal injury.



Warning

This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Yokogawa Corporation of America shall not be held liable for damages resulting from such improper use.

Limited Warranty

Yokogawa Corporation of America warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Yokogawa's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit.

Registered Trademarks

All other trademarks mentioned in this document are the property of their respective owners.

© 2011 Yokogawa Corporation of America. All rights reserved.

www.yokogawa-usa.com

Table of Contents

INTRODUCTION	7
ORDERING INFORMATION	7
SPECIFICATIONS	9
General	9
YPP6210 Process Input	11
YPP6310 Pulse Input	11
Batch Controller Rate/Totalizer Display	12
Relays	13
Isolated 4-20 mA Transmitter Output	14
Modbus® RTU Serial Communications	15
YPPA1044 Digital Input & Output Expansion Module	15
COMPLIANCE INFORMATION	16
Safety	16
Electromagnetic Compatibility	16
SAFETY INFORMATION	17
INSTALLATION	18
Unpacking	18
Panel Mounting Instructions	18
Configuration for 12 or 24 VDC Power Option	20
Transmitter Supply Voltage Selection (P+, P-)	21
Connections	21
Connectors Labeling	22
Power Connections	22
YPP6210 Signal Connections	23
YPP6310 Signal Connections	25
Modbus RTU Serial Communications	27
Relay Connections	27
Switching Inductive Loads	27
4-20 mA Output Connections	28
Analog Output Transmitter Power Supply	29
External Relay & Digital I/O Connections	29
Interlock Relay Feature	30
BASIC OPERATION AND PROGRAMMING	31
Front Panel Buttons and Status LED Indicators	32
Controller Operation	33
Batch Control Operation Example	34
Setting Numeric Values	42
Reset Menu (rE5Et)	42

Control Menu (CONTROL) -----	42
Setting Up the Batch Controller (SETUP) -----	43
Scaling and Calibration -----	44
Setting the Input Signal -----	44
Setting the Totalizer and Batching Features (TOTAL) -----	45
Setting the Decimal Point (DEC PT) -----	45
Programming the Rate/Totalizer (PROG) -----	45
Scaling the Controller (SCALE) -----	47
Time Base, Total Conversion Factor & Total Reset -----	48
Batch Start Mode (START) -----	48
Calibrating the Controller with External Source (CAL) -----	49
Setting the Display Parameter & Intensity (DISPLAY) -----	50
Display Setup Menu -----	51
Character Set for Engineering Units Display (CHAR) -----	52
Setting the Relay Operation (RELAY) -----	53
Relay Assignment (ASSIGN) -----	54
Setting the Relay Action -----	55
Setting Batch Control Relays -----	55
Programming Alarm Set and Reset Points -----	56
Setting Fail-Safe Operation -----	56
Programming Time Delay -----	56
Relay Action for Loss of 4-20 mA Input (Loop Break) -----	56
Relay Operation Details -----	57
Overview -----	57
Relays Initialization -----	57
Fail-Safe Operation -----	57
Front Panel LEDs -----	58
Automatic Reset (RESET) -----	58
Pump Alternation Control -----	58
Setting Up the Interlock Relay (Force On) Feature -----	59
Sample Relay Operation -----	60
Relay and Alarm Operation Diagrams -----	60
High Alarm Operation (Set > Reset) -----	60
Low Alarm Operation (Set < Reset) -----	60
High Alarm with Fail-Safe Operation (Set > Reset) -----	61
Low Alarm with Fail-Safe Operation (Set < Reset) -----	61
Rate Relay Sampling Operation -----	61
Total Relay Sampling Operation -----	62
Signal Loss or Loop Break Relay Operation -----	63
Time Delay Operation -----	64
Scaling the 4-20 mA Analog Output (ANAL) -----	65
Setting Up the Password (PASS) -----	66
Protecting or Locking the Controller -----	66

Model YPP6210 & YPP6310 Batch Controllers	Instruction Manual
Grand Total Reset Password & Non-Resettable Total	67
Making Changes to a Password Protected Controller	67
Disabling Password Protection	68
ADVANCED OPERATION AND PROGRAMMING	69
Advanced Features Menu & Display Messages	70
Programmable Function Keys User Menu (<i>u5Er</i>)	73
Multi-Point Calibration & Scaling	74
PROPLUS Software	74
Noise Filter Bypass (<i>bYPR55</i>)	76
Modbus RTU Serial Communications (<i>5Er iRL</i>)	77
Select Menu (<i>5EL Ect</i>)	78
Signal Conditioning Selection (<i>Functn</i>)	78
Analog Output Programming (<i>ROutPr</i>)	80
YPP6210 Only: Internal Source Calibration (<i>iRL</i>)	81
Controller Copy Function (<i>CoPY</i>)	84
TROUBLESHOOTING	86
Diagnostics Menu (<i>d iRL</i>)	86
Determining Software Version	86
Reset Controller to Factory Defaults	87
Factory Defaults & User Settings	88
Troubleshooting Tips	92
Alphabetical List of Display Functions & Messages	93

Table of Figures

Figure 1: 1/8 DIN Panel Cutout and Mounting.....	18
Figure 2: Controller Dimensions - Side View	19
Figure 3: Controller Dimensions - Top View	19
Figure 4: Jumper Configuration for 12/24 VDC Power	20
Figure 5: Transmitter Supply Voltage Selection	21
Figure 6: Connector Labeling for Fully Loaded YPP6210.....	22
Figure 7: Power Connections	22
Figure 8: Transmitters Powered by Internal Supply	23
Figure 9: Transmitter Powered by Ext. Supply or Self-Powered	23
Figure 10: Voltage Input Connections	24
Figure 11: Flowmeter Powered by Internal Power Supply.....	25
Figure 12: Flowmeter Powered by External Supply	25
Figure 13: Self-Powered Magnetic Pickup Coil Flowmeter.....	25
Figure 14: Relay Connections	27
Figure 15: AC and DC Loads Protection	27
Figure 16: Low Voltage DC Loads Protection.....	28
Figure 17: 4-20 mA Output Connections	28
Figure 18: Expansion Modules & DIN Rail Mounting Kit.....	29
Figure 19: External Relays Module Connections	30
Figure 20: Digital I/O Module Connections	30
Figure 21: Interlock Connection.....	30
Figure 22: Controller Copy Connection.....	84
Figure 23: 1/8 DIN Panel Cutout Template	101

INTRODUCTION

The **PROPLUS** YPP6210 and YPP6310 are easy to use batch controllers ideal for simplifying independent batch control operations where local control is preferred to expensive and expansive plant operation systems.

The controller comes programmed for easy front panel start, pause, stop, and batch size (preset) changes. The bottom display can be programmed to display rate, grand total, batch count, or preset by cycling the Stop (F3) button.

Single and multi-stage batching is possible with up to 4 on-board relays and 4 with the external relay module. Each batch control relay may have a unique precise amount when used for multi-stage batching.

Manual start batching is default, but automatic batching with a restart after a programmed time delay from the completion of the last batch, is also possible.

Overrun correction adjusts the closing of the batch control relays to adjust for inaccuracies from batch to batch. This increases accuracy over time as systems wear out.

At least two SPDT relays are included for use in batch control or rate alarms.

The batch controllers also share all common **PROPLUS** Series features, including an isolated 24 VDC transmitter power supply and Modbus RTU Serial communications.

ORDERING INFORMATION

Analog Input Standard Models

85-265 VAC Model	12/24 VDC Model	Options Installed
YPP6210-6R2	YPP6210-7R2	2 relays
YPP6210-6R4	YPP6210-7R4	4 relays
YPP6210-6R5	YPP6210-7R5	2 relays & 4-20 mA output
YPP6210-6R7	YPP6210-7R7	4 relays & 4-20 mA output

Analog Input SunBright Display Models

85-265 VAC Model	12/24 VDC Model	Options Installed
YPP6210-6H2	YPP6210-7H2	2 relays
YPP6210-6H4	YPP6210-7H4	4 relays
YPP6210-6H5	YPP6210-7H5	2 relays & 4-20 mA output
YPP6210-6H7	YPP6210-7H7	4 relays & 4-20 mA output

Pulse Input Standard Models

85-265 VAC Model	12/24 VDC Model	Options Installed
YPP6310-6R2	YPP6310-7R2	2 relays
YPP6310-6R4	YPP6310-7R4	4 relays
YPP6310-6R5	YPP6310-7R5	2 relays & 4-20 mA output
YPP6310-6R7	YPP6310-7R7	4 relays & 4-20 mA output

Pulse Input SunBright Display Models

85-265 VAC Model	12/24 VDC Model	Options Installed
YPP6310-6H2	YPP6310-7H2	2 relays
YPP6310-6H4	YPP6310-7H4	4 relays
YPP6310-6H5	YPP6310-7H5	2 relays & 4-20 mA output
YPP6310-6H7	YPP6310-7H7	4 relays & 4-20 mA output

Accessories

Model	Description
YPPA1002	DIN rail mounting kit for two expansion modules
YPPA1004	4 SPST (Form A) relays
YPPA1044	4 digital inputs & 4 digital outputs (2 may be connected)
YPPA1200	Meter copy cable
YPPA1232	RS-232 serial adapter
YPPA1485	RS-485 serial adapter
YPPA7485-I	RS-232 to RS-422/485 isolated converter
YPPA8232-N	USB to RS-232 non-isolated converter
YPPA8485-I	USB to RS-422/485 isolated converter
YPPA8008	USB serial adapter
YPPX6901	Suppressor (snubber): 0.01 μ F/470 Ω , 250 VAC

Enclosures

Model	Description
YPPA2811	1 Meter Plastic NEMA 4X Enclosure
YPPA2812	2 Meter Plastic NEMA 4X Enclosure

SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

General

DISPLAY	Main display: 0.6" (15 mm) high, red LEDs Second display: 0.46" (12 mm) high, red LEDs 6 digits: each (-99999 to 999999), with lead zero blanking.
DEFAULT DISPLAY ASSIGNMENT	The main (Big) display shows batch total. The small (Little) display shows rate with alternating units, and can be switched to show grand total, batch count, or preset with the STOP key.
CUSTOM DISPLAY ASSIGNMENT	The main (Big) and small (Little) displays may be assigned to rate, total, grand total, batch count, preset, set points, units (lower display only), alternating R & T, R & GT, preset & rate, max & min, or a Modbus display register. Any rate display may be programmed to alternate with a custom unit or tag.
ALTERNATING DISPLAY	Displays alternate every 10 seconds when display is selected or the batch is paused.
DISPLAY INTENSITY	Eight user selectable intensity levels
DISPLAY UPDATE RATE	5/second (200 ms)
OVERRANGE	Display flashes 999999
UNDERRANGE	Display flashes -99999
FRONT PANEL	NEMA 4X, IP65
PROGRAMMING METHODS	Four front panel buttons, digital inputs, PC and PROPLUS software, or cloning using Copy function.
NOISE FILTER	Programmable from 2 to 199 (0 will disable filter)
FILTER BYPASS	Programmable from 0.1 to 99.9% of calibrated span
RECALIBRATION	All ranges are calibrated at the factory. Recalibration is recommended at least every 12 months.
MAX/MIN DISPLAY	Max/min readings reached by the process are stored until reset by the user or until power to the controller is turned off.

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

PASSWORD	Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals. Pass 1: Allows use of function keys and digital inputs Pass 2: Allows use of function keys, digital inputs and editing set/reset points Pass 3: Restricts all programming, function keys, and digital inputs. Total Password: Prevents resetting the total manually Gtotal Password: Prevents resetting the grand total manually
NON-VOLATILE MEMORY	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
POWER OPTIONS	85-265 VAC 50/60 Hz, 90-265 VDC, 20 W max or jumper selectable 12/24 VDC \pm 10%, 15 W max
FUSE	Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 controllers may share one 5 A fuse
ISOLATED TRANSMITTER POWER SUPPLY	Terminals P+ & P-: 24 VDC \pm 5% @ 200 mA max (standard), (12/24 VDC powered models rated @ 100 mA max). 5 or 10 VDC @ 50 mA max, selectable with internal jumper J4.
NORMAL MODE REJECTION	Greater than 60 dB at 50/60 Hz
ISOLATION	4 kV input/output-to-power line 500 V input-to-output or output-to-P+ supply
OVERVOLTAGE CATEGORY	Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III.
ENVIRONMENTAL	Operating temperature range: -40 to 65°C Storage temperature range: -40 to 85°C Relative humidity: 0 to 90% non-condensing
CONNECTIONS	Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
ENCLOSURE	1/8 DIN, high impact plastic, UL 94V-0, color: black
MOUNTING	1/8 DIN panel cutout required: 3.622" x 1.772" (92 mm x 45 mm) Two panel mounting bracket assemblies are provided.
TIGHTENING TORQUE	Screw terminal connectors: 5 lb-in (0.56 Nm)
OVERALL DIMENSIONS	4.68" x 2.45" x 5.64" (119 mm x 62 mm x 143 mm) (W x H x D)
WEIGHT	9.5 oz (269 g)
WARRANTY	3 years parts & labor

YPP6210 Process Input

INPUTS	Field selectable: 0-20, 4-20 mA, ± 10 V (0-5, 1-5, 0-10 V), Modbus PV (Slave)								
ACCURACY	$\pm 0.03\%$ of calibrated span ± 1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span								
TEMPERATURE DRIFT	0.005% of calibrated span/ $^{\circ}\text{C}$ max from 0 to 65 $^{\circ}\text{C}$ ambient, 0.01% of calibrated span/ $^{\circ}\text{C}$ max from -40 to 0 $^{\circ}\text{C}$ ambient								
SIGNAL INPUT CONDITIONING	Linear, square root, or programmable exponent								
MULTI-POINT LINEARIZATION	2 to 32 points								
PROGRAMMABLE EXPONENT	1.0001 to 2.9999								
LOW-FLOW CUTOFF	0-999999 (0 disables cutoff function)								
DECIMAL POINT	Up to five decimal places or none: <i>d.ddddd, d.dddd, d.ddd, d.dd, d.d, or d</i>								
CALIBRATION RANGE	<table border="0"> <tr> <td>Input</td> <td>Minimum Span</td> </tr> <tr> <td>Range</td> <td>Input 1 & Input 2</td> </tr> <tr> <td>4-20 mA</td> <td>0.15 mA</td> </tr> <tr> <td>± 10 V</td> <td>0.10 V</td> </tr> </table> <p>An error message will appear if the input 1 and input 2 signals are too close together.</p>	Input	Minimum Span	Range	Input 1 & Input 2	4-20 mA	0.15 mA	± 10 V	0.10 V
Input	Minimum Span								
Range	Input 1 & Input 2								
4-20 mA	0.15 mA								
± 10 V	0.10 V								
INPUT IMPEDANCE	Voltage ranges: greater than 1 M Ω Current ranges: 50 - 100 Ω (depending on resettable fuse impedance)								
INPUT OVERLOAD	Current input protected by resettable fuse, 30 VDC max. Fuse resets automatically after fault is removed.								

YPP6310 Pulse Input

INPUTS	Field selectable: Pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 k Ω pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 k Ω pull-up to 5 V @ 40 Hz; Modbus PV (Slave)
LOW VOLTAGE MAG PICKUP (Isolated)	Sensitivity: 40 mVp-p to 8Vp-p
MINIMUM INPUT FREQUENCY	0.001 Hz Minimum frequency is dependent on high gate setting.
MAXIMUM INPUT FREQUENCY	30,000 Hz (10,000 for low voltage mag pickup)


Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

INPUT IMPEDANCE	Pulse input: Greater than 300 k Ω @ 1 kHz. Open collector/switch input: 4.7 k Ω pull-up to 5 V.
ACCURACY	$\pm 0.03\%$ of calibrated span ± 1 count
TEMPERATURE DRIFT	Rate display is not affected by changes in temperature.
MULTI-POINT LINEARIZATION	2 to 32 points
LOW-FLOW CUTOFF	0-999999 (0 disables cutoff function)
DECIMAL POINT	Up to five decimal places or none: <i>d.dddddd, d.ddddd, d.dddd, d.ddd, d.d, or ddddddd</i>
CALIBRATION	May be calibrated using K-factor, internal calibration, or by applying an external calibration signal.
K-FACTOR	Field programmable K-factor converts input pulses to rate in engineering units. May be programmed from 0.00001 to 999,999 pulses/unit.
CALIBRATION RANGE	Input 1 signal may be set anywhere in the range of the controller; input 2 signal may be set anywhere above or below input 1 setting. Minimum input span between any two inputs is 10 Hz. An Error message will appear if the input 1 and input 2 signals are too close together.
FILTER	Programmable contact de-bounce filter: 40 to 999 Hz maximum input frequency allowed with low speed filter.
TIME BASE	Second, minute, hour, or day
GATE	Low gate: 0.1-99.9 seconds High gate: 2.0-999.9 seconds

Batch Controller Rate/Totalizer Display

RATE DISPLAY INDICATION	-99999 to 999999, lead zero blanking. "R" LED illuminates while displaying rate.
BATCH TOTAL & GRAND TOTAL DISPLAY	0 to 999,999; automatic lead zero blanking. "T" LED is illuminated while displaying batch total. "GT" LEDs are illuminated while displaying grand total. Up to 999,999 for batch total/preset. Up to 999,999,999 with grand total-overflow feature. "oF" is displayed to the left of grand total overflow and \blacktriangle LED is illuminated.
BATCH TOTAL DECIMAL POINT	Up to five decimal places or none: <i>d.dddddd, d.ddddd, d.dddd, d.ddd, d.d, or ddddddd</i> Total decimal point is independent of rate decimal point.

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

TOTALIZER	Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed.
GRAND TOTALIZER ROLLOVER	Grand totalizer rolls over when display exceeds 999,999,999. Relay status reflects display.
GRAND TOTAL ALARMS	Up to seven, user selectable under setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the controller for total alarm indication. Relay 1 should always be assigned to batch.
PROGRAMMABLE DELAY ON RELEASE	0.1 and 999.9 seconds; applied to the first relay assigned to total or grand total. If the controller is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.
GRAND TOTAL RESET	Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
GRAND TOTAL RESET PASSWORD	Grand total passwords may be entered to prevent resetting the grand total from the front panel.
NON-RESETTABLE GRAND TOTAL	The grand total can be programmed as a non-resettable total by entering the password "050873".  Caution! Once the Grand Total has been programmed as "non-resettable" the feature cannot be disabled.
Relays	
RATING	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (\approx 50 W) @ 125/250 VAC for inductive loads
NOISE SUPPRESSION	Noise suppression is recommended for each relay contact switching inductive loads; see page 27 for details.
RELAY ASSIGNMENT	Relays may be assigned to batch control, sampling, rate, or grand total alarms.
PRECLOSE	0-100% of batch size, individually user programmable for each additional batch control relay beyond the first.
ALARM DEAD-BAND	0-100% of span, user programmable
HIGH OR LOW ALARM	User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turn off).

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

RELAY OPERATION	Batch control Automatic (non-latching) ¹ Sampling Off (disable unused relays and enable Interlock feature) Manual on/off control mode Secondary Functions ² Pump alternation control (2 to 8 relays) Latching (requires manual acknowledge)
RELAY RESET	User selectable via front panel buttons, digital inputs, or PC <ol style="list-style-type: none">1. Automatic reset only (non-latching), when the input passes the reset point or total is reset to zero.2. Automatic + manual reset at any time (non-latching)3. Manual reset only, at any time (latching)4. Manual reset only after alarm condition has cleared (L) <i>Note: Digital inputs may be assigned to acknowledge relays programmed for manual reset. It is not recommended to change the functions of front panel buttons to manual reset.</i>
ALARM TIME DELAY	0 to 999.9 seconds, on & off relay time delays Programmable and independent for each relay.
FAIL-SAFE OPERATION	Programmable and independent for each relay. <i>Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.</i>
ALARM AUTO INITIALIZATION	When power is applied to the controller, relays will reflect the state of the input to the controller. ¹
<ol style="list-style-type: none">1. Alarms are active only when the batch is running.2. These functions are not functional when the unit is being used as a batch controller with total set to yes.	
Isolated 4-20 mA Transmitter Output	
OUTPUT SOURCE	Rate/process, total, grand total, max, min, set points 1-8, Modbus register, or manual control mode
SCALING RANGE	1.000 to 23.000 mA for any display range.
CALIBRATION	Factory calibrated: 4.000 to 20.000 = 4-20 mA output
ANALOG OUT PROGRAMMING	23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break
ACCURACY	± 0.1% FS ± 0.004 mA
TEMPERATURE DRIFT	0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient <i>Note: Analog output drift is separate from input drift.</i>
ISOLATED TRANSMITTER POWER SUPPLY	Terminals I+ & R: 24 VDC ± 5% @ 40 mA maximum; may be used to power the 4-20 mA output or other devices. Refer to Figure 6 on page 22 and Figure 17 on page 28.

EXTERNAL LOOP POWER SUPPLY 35 VDC maximum

OUTPUT LOOP RESISTANCE	Power supply	Minimum	Maximum
	24 VDC	10 Ω	700 Ω
	35 VDC (external)	100 Ω	1200 Ω

Modbus[®] RTU Serial Communications

SLAVE ID	1 – 247 (Controller address)
BAUD RATE	300 - 19,200 bps
TRANSMIT TIME DELAY	Programmable between 0 and 199 ms
DATA	8 bit (1 start bit, 1 or 2 stop bits)
PARITY	Even, Odd, or None with 1 or 2 stop bits
BYTE-TO-BYTE TIMEOUT	0.01 – 2.54 second
TURN AROUND DELAY	Less than 2 ms (fixed)

*Note: Refer to the **PROPLUS** Modbus Register Tables located at www.yokogawa-usa.com for details.*

YPPA1044 Digital Input & Output Expansion Module

CHANNELS	4 digital inputs & 4 digital outputs per module
SYSTEM	Up to 2 modules for a total of 8 inputs & 8 outputs
DIGITAL INPUT LOGIC HIGH	3 to 5 VDC
DIGITAL INPUT LOGIC LOW	0 to 1.25 VDC
DIGITAL OUTPUT LOGIC HIGH	3.1 to 3.3 VDC
DIGITAL OUTPUT LOGIC LOW	0 to 0.4 VDC
SOURCE CURRENT	10 mA maximum output current
SINK CURRENT	1.5 mA minimum input current
+5 V TERMINAL	To be used as pull-up for digital inputs only Connect normally open pushbuttons across +5 V & DI 1-4.

COMPLIANCE INFORMATION

Safety

UL & c-UL LISTED	USA & Canada UL 508 Industrial Control Equipment
UL FILE NUMBER	E348677
FRONT PANEL	UL Type 4X, NEMA 4X, IP65; panel gasket provided
LOW VOLTAGE DIRECTIVE	EN 61010-1:2001 Safety requirements for measurement, control, and laboratory use

Electromagnetic Compatibility

EMISSIONS	EN 55022:2006/A1:2007 Class A ITE emissions requirements
Radiated Emissions	Class A
AC Mains Conducted Emissions	Class A
IMMUNITY	EN 61326-1:2006 Measurement, control, and laboratory equipment EN 61000-6-2:2005 EMC heavy industrial generic immunity standard
RFI - Amplitude Modulated	80 -1000 MHz 10 V/m 80% AM (1 kHz) 1.4 - 2.0 GHz 3 V/m 80% AM (1 kHz) 2.0 - 2.7 GHz 1 V/m 80% AM (1 kHz)
Electrical Fast Transients	±2kV AC mains, ±1kV other
Electrostatic Discharge	±4kV contact, ±8kV air
RFI - Conducted	10V, 0.15-80 MHz, 1kHz 80% AM
AC Surge	±2kV Common, ±1kV Differential
Surge	1KV (CM)
Power-Frequency Magnetic Field	3 A/m 70%V for 0.5 period
Voltage Dips	40%V for 5 & 50 periods 70%V for 25 periods
Voltage Interruptions	<5%V for 250 periods

Note:

Testing was conducted on YPP6200 and YPP6300 series meters installed through the covers of grounded metal enclosures with cable shields grounded at the point of entry representing installations designed to optimize EMC performance. All hardware is identical to the YPP6210 and YPP6310 controllers.

Declaration of Conformity available at www.yokogawa-usa.com

SAFETY INFORMATION



CAUTION: Read complete instructions prior to installation and operation of the controller.



WARNING: Risk of electric shock or personal injury.



Warning!

***Hazardous voltages exist within enclosure.
Installation and service should be performed only by
trained service personnel.***

INSTALLATION

There is no need to remove the controller from its case to complete the installation, wiring, and setup of the controller for most applications. Instructions are provided for setting up a 12/24 VDC powered controller to operate from 12 VDC and for changing the transmitter power supply to output 5 or 10 VDC instead of 24 VDC, see page 20.

Unpacking

Remove the controller from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier.

If any part is missing or the controller malfunctions, please contact your supplier or the factory for assistance.

Panel Mounting Instructions

- Prepare a standard 1/8 DIN panel cutout – 3.622" x 1.772" (92 mm x 45 mm). Refer to Figure 1 for more details.
- Clearance: allow at least 6.0" (152 mm) behind the panel for wiring.
- Panel thickness: 0.04" - 0.25" (1.0 mm - 6.4 mm).
Recommended minimum panel thickness to maintain Type 4X rating: 0.06" (1.5 mm) steel panel, 0.16" (4.1 mm) plastic panel.
- Remove the two mounting brackets provided with the controller (back-off the two screws so that there is ¼" (6.4 mm) or less through the bracket. Slide the bracket toward the front of the case and remove).
- Insert controller into the panel cutout.
- Install mounting brackets and tighten the screws against the panel. To achieve a proper seal, tighten the mounting bracket screws evenly until controller is snug to the panel along its short side. **DO NOT OVER TIGHTEN**, as the rear of the panel may be damaged.

Note: See Figure 23 on page 101 for 1/8 DIN Panel Cutout Template.

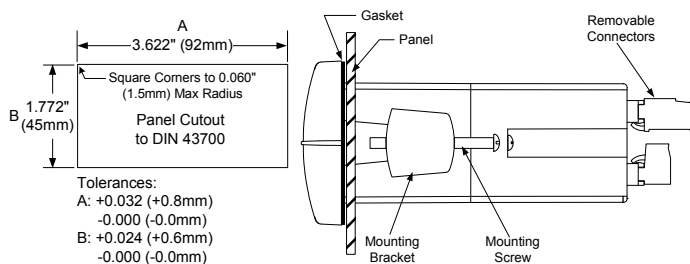


Figure 1: 1/8 DIN Panel Cutout and Mounting

Dimensions

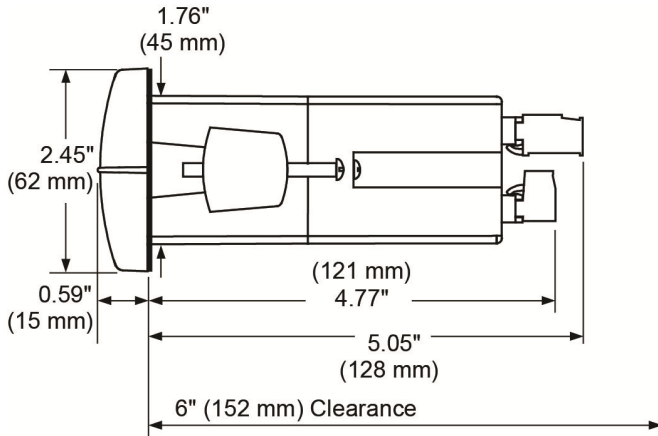


Figure 2: Controller Dimensions - Side View

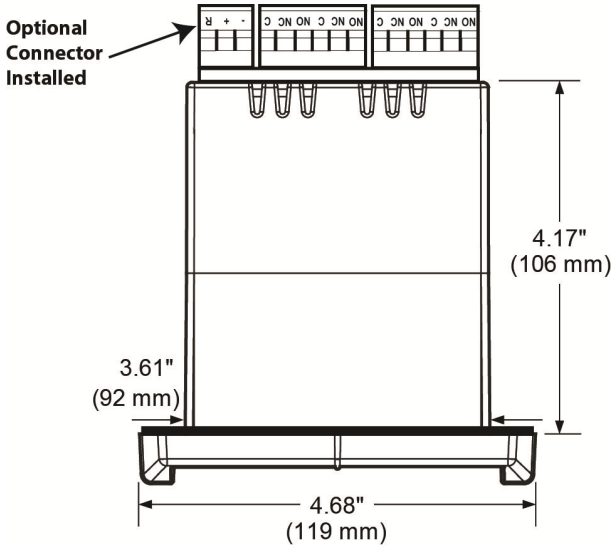


Figure 3: Controller Dimensions - Top View



Warning!

Do not exceed voltage rating of the selected configuration.

Controllers equipped with the 12/24 VDC power option are shipped from the factory ready to operate from 24 VDC.

To configure the controller for 12 VDC power:

1. Remove all the connectors.
2. Unscrew the back cover.
3. Slide the back cover about 1 inch.
4. Configure the J9 jumper, located behind the power connector, for 12 V as shown below.

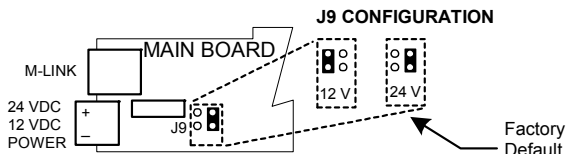


Figure 4: Jumper Configuration for 12/24 VDC Power

Transmitter Supply Voltage Selection (P+, P-)

All controllers, including models equipped with the 12/24 VDC power option, are shipped from the factory configured to provide 24 VDC power for the transmitter or sensor.

If the transmitter requires 5 or 10 VDC excitation, the internal jumper J4 must be configured accordingly.

To access the voltage selection jumper:

1. Remove all the connectors.
2. Unscrew the back cover.
3. Slide the back cover about 1 inch.
4. Configure the J4 jumper, located behind the input signal connector, for the desired excitation voltage as shown.

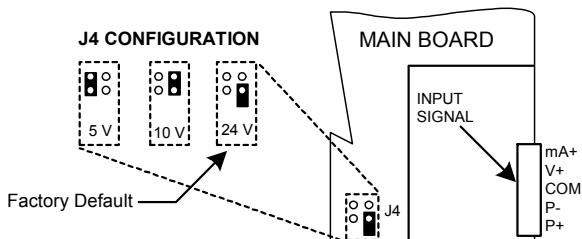


Figure 5: Transmitter Supply Voltage Selection

Connections

All connections are made to removable screw terminal connectors located at the rear of the controller.



Caution!

Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the controller and ensure personnel safety.

Connectors Labeling

The connectors' label, affixed to the controller, shows the location of all connectors available with requested configuration.



Warning!

Do not connect any equipment other than Yokogawa's expansion modules, cables, or controllers to the RJ45 M-LINK connector. Otherwise damage will occur to the equipment and the controller.

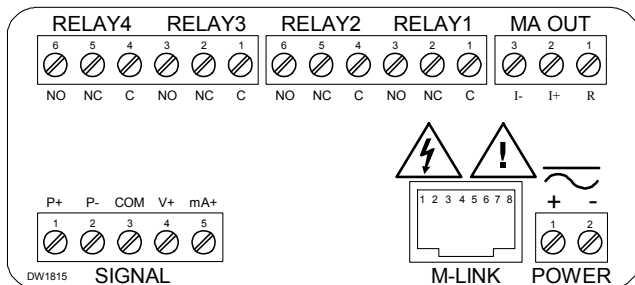


Figure 6: Connector Labeling for Fully Loaded YPP6210

Power Connections

Power connections are made to a two-terminal connector labeled POWER on Figure 6. The controller will operate regardless of DC polarity connection. The + and - symbols are only a suggested wiring convention.

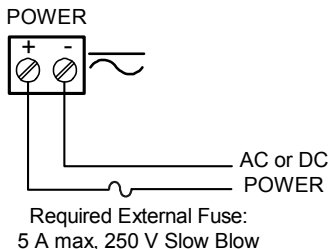


Figure 7: Power Connections

YPP6210 Signal Connections

Signal connections are made to a five-terminal connector labeled SIGNAL on Figure 6. The COM (common) terminal is the return for the 4-20 mA and the ± 10 V input signals.

Current and Voltage Connections

The following figures show examples of current and voltage connections. There are no switches or jumpers to set up for current and voltage inputs. Setup and programming is performed through the front panel buttons.

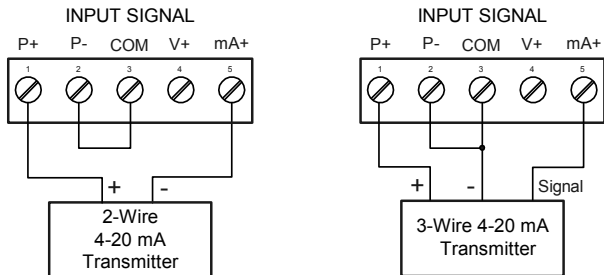


Figure 8: Transmitters Powered by Internal Supply

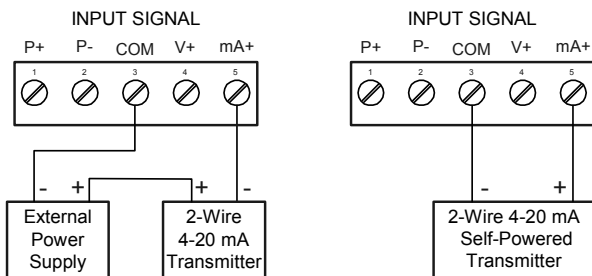


Figure 9: Transmitter Powered by Ext. Supply or Self-Powered

The current input is protected against current overload by a resettable fuse. The display may or may not show a fault condition depending on the nature of the overload.

The fuse limits the current to a safe level when it detects a fault condition, and automatically resets itself when the fault condition is removed.

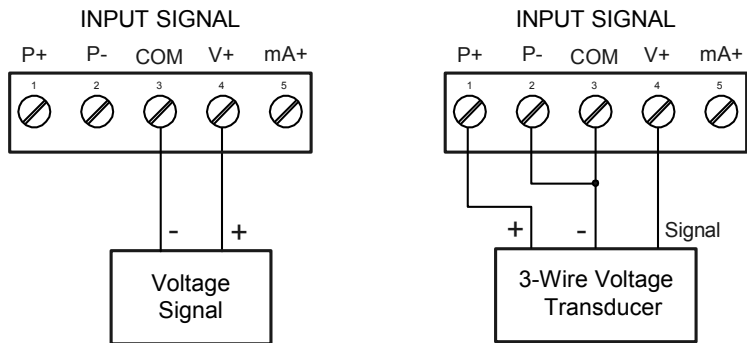


Figure 10: Voltage Input Connections

The controller is capable of accepting any voltage from -10 VDC to +10 VDC.

YPP6310 Signal Connections

Signal connections are made to a five-terminal connector labeled SIGNAL on Figure 6. The COM (common) terminal is the return for the input signals.

The following figures show examples of signal connections.

Setup and programming is performed through the front panel buttons.

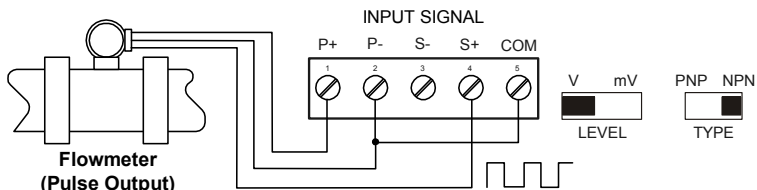


Figure 11: Flowmeter Powered by Internal Power Supply

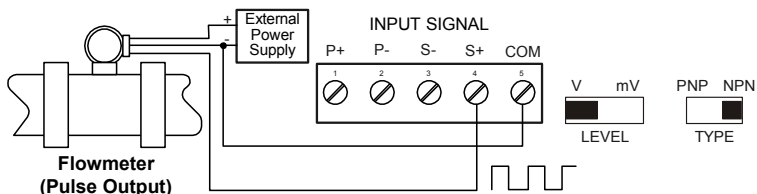


Figure 12: Flowmeter Powered by External Supply

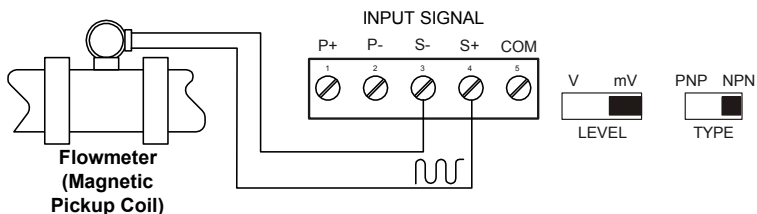


Figure 13: Self-Powered Magnetic Pickup Coil Flowmeter

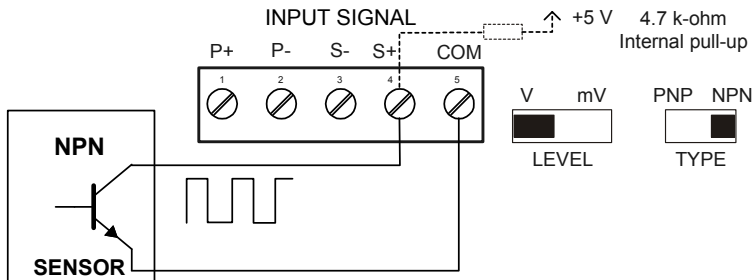


Figure 11: NPN open Collector Input

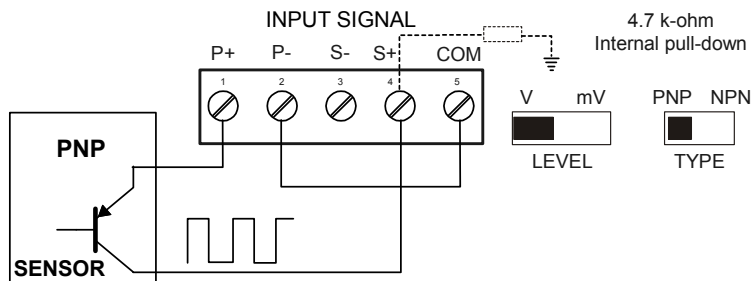


Figure 12: PNP Sensor Powered by Internal Supply

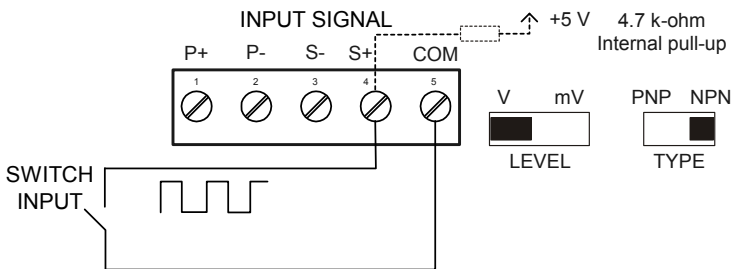


Figure 13: Switch Input Connections

Modbus RTU Serial Communications

Serial communications connection is made to an RJ45 connector labeled M-LINK on Figure 6. Use the YPPA1232 for RS-232 interfacing, the YPPA1485 for RS-485 interfacing, or the YPPA8008 for USB interfacing. The same port is used for interfacing with all expansion modules (e.g. external relays, digital I/O).

Use the YPPA1200 controller copy cable for meter-to-meter interfacing for cloning purposes (*i.e.* copying settings from one controller to other controllers).

Relay Connections

Relay connections are made to two six-terminal connectors labeled RELAY1 – RELAY4 on Figure 6. Each relay's C terminal is common only to the normally open (NO) and normally closed (NC) contacts of the corresponding relay. The relays' C terminals should not be confused with the COM (common) terminal of the INPUT SIGNAL connector.

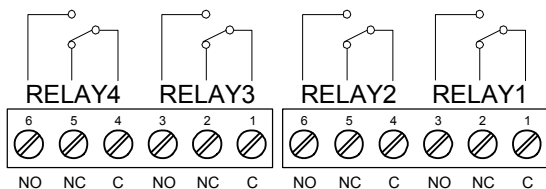


Figure 14: Relay Connections

Switching Inductive Loads

The use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The suppressors also prolong the life of the relay contacts. Suppression can be obtained with resistor-capacitor (RC) networks assembled by the user or purchased as complete assemblies. Refer to the following circuits for RC network assembly and installation:

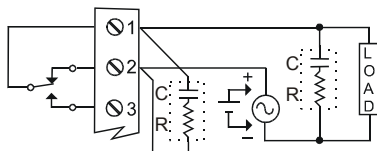


Figure 15: AC and DC Loads Protection

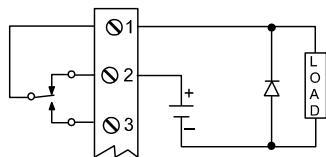
Choose R and C as follows:

R: 0.5 to 1 Ω for each volt across the contacts

C: 0.5 to 1 μF for each amp through closed contacts

Notes:

1. Use capacitors rated for 250 VAC.
2. RC networks may affect load release time of solenoid loads. Check to confirm proper operation.
3. Install the RC network at the controller's relay screw terminals. An RC network may also be installed across the load. Experiment for best results.



Use a diode with a reverse breakdown voltage two to three times the circuit voltage and forward current at least as large as the load current.

Figure 16: Low Voltage DC Loads Protection

Note: Relays are de-rated to 1/14th HP (50 watts) with an inductive load.

4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled MA OUT. The 4-20 mA output may be powered internally or from an external power supply.

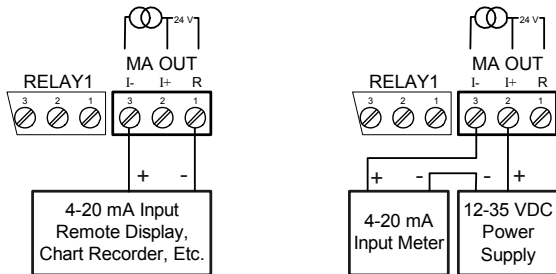


Figure 17: 4-20 mA Output Connections

Analog Output Transmitter Power Supply

The internal 24 VDC power supply powering the analog output may be used to power other devices, if the analog output is not used. The I+ terminal is the +24 V and the R terminal is the return. This power supply is capable of sourcing up to 40 mA.

External Relay & Digital I/O Connections

The relay and the digital I/O expansion modules YPPA1004 & YPPA1044 are connected to the controller using a CAT5 cable provided with each module. The two RJ45 connectors on the expansion modules are identical and interchangeable; they are used to connect additional modules to the system.

Note: The jumper located between the RJ45 connectors of the YPPA1044 must be removed on the second digital I/O module in order for the system to recognize it as module #2.



Warning!

Do not connect or disconnect the expansion modules with the power on!

More detailed instructions are provided with each optional expansion module.

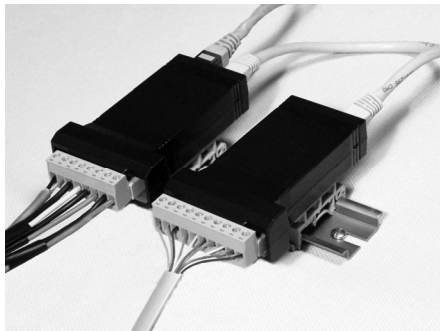


Figure 18: Expansion Modules & DIN Rail Mounting Kit

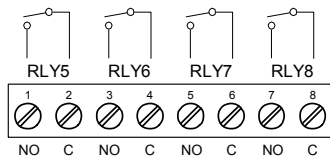


Figure 19: External Relays Module Connections

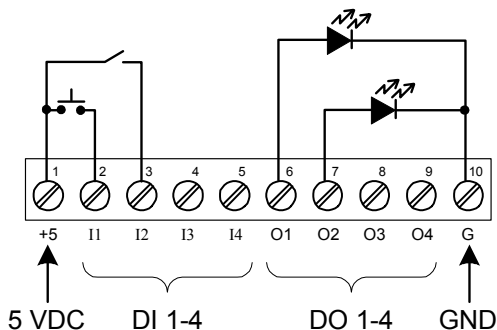


Figure 20: Digital I/O Module Connections

Interlock Relay Feature

As the name implies, the interlock relay feature reassigns one, or more, alarm/control relays for use as interlock relay(s). Interlock contact(s) are wired to digital input(s) and trigger the interlock relay. This feature is enabled by configuring the relay, and relative digital input(s) (see page 59). In one example, dry interlock contacts are connected in series to one digital input which will be used to force on (energize) the assigned interlock power relay when all interlock contacts are closed (safe). The interlock relay front panel LED flashes when locked out. The interlock relay would be wired in-series with the load (N/O contact). See below.

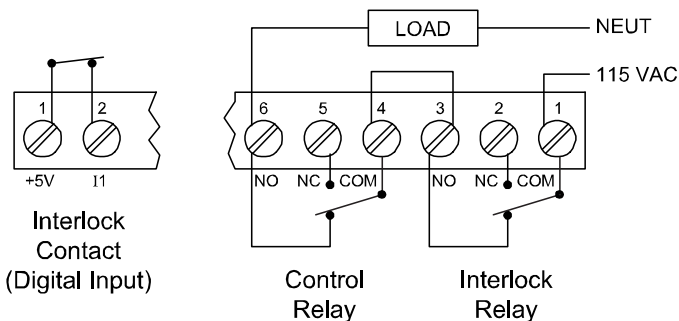


Figure 21: Interlock Connection

BASIC OPERATION AND PROGRAMMING

The YPP6210 is factory calibrated prior to shipment to read in milliamps and volts depending on the input selection. The calibration equipment is certified to NIST standards.

The YPP6310 has been factory calibrated to read input frequency in Hz (pulses/sec). The calibration equipment is certified to NIST standards.

Overview

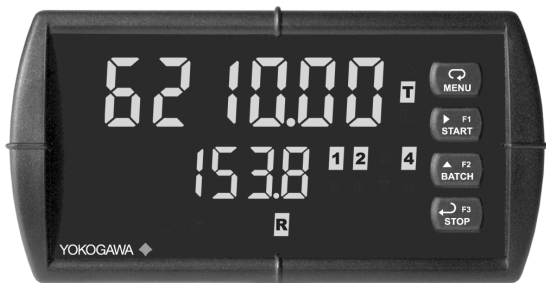
There are no jumpers on the YPP6210 to set for the controller input selection. There are two switches on the YPP6310, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the controller, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.





Setup and programming is done through the front panel buttons.

After power and input signal connections have been completed and verified, apply power to the controller.

**Default Setting*

Front Panel Buttons and Status LED Indicators



Button Symbol	Description
	Menu
	START (Right arrow/F1)
	BATCH (Up arrow/F2)
	STOP (Enter/F3)
<p><i>Note:</i> Alarms 5-8 enabled when relay expansion module is installed.</p>	

LED	Status
1-8	Relay 1 – 8 indicator
R	Rate indicator
T	Batch Total indicator
G T	Grand Total indicator
▲	Total overflow indicator
M	Manual control relays &/or analog output

- Press the Menu button to enter or exit the Programming Mode at any time.
- Press the Right arrow button to move to the next digit during digit or decimal point programming.
- Press or hold the Up arrow button to scroll through the menus, decimal point or press or hold to increment the value of a digit.
- Press the Enter button to access a menu or to accept a setting.
- Press and hold the Menu button for three seconds to access the advanced features of the controller.

Controller Operation

The YPP6210 controller is capable of accepting current (0-20 mA, 4-20 mA) and voltage signals (0-5 V, 1-5 V, 0-10 V, ± 10 V) and the YPP6310 accepts pulses (e.g. ± 40 mV to ± 8 V), square wave (0-5, 0-12V, or 0-24V), open collector NPN, PNP, TTL, or switch contact signals.

These signals are scaled to represent rate in engineering units from -99999 to 999999. The pulse signals may be scaled with a K-factor to represent a total for the batch, and grand total.

The default configuration displays batch total on the big display, and a selection of rate, grand total, batch count, and preset on the little display.

When in pause or stop mode, the display will alternate the numeric value with the run status in the big display and the display label for the little display.

The controller has up to 4 relays on board (and 4 available with an external expansion module) which are used to either control the batch process in single or multi-stage batch control, or as alarms that will be active when the batch process is running. A 4-20 mA output option is also available for retransmitting the process variable analog or pulse signal.

Default Batch Control Operation

The following describes the operation of the three front panel operating keys as programmed with default settings.

START Button

Press the START button to begin a new batch process.

BATCH Button

Press the Batch button to access the Preset (batch amount) menu. Program the batch with the arrow keys, and confirm with the Enter key.

STOP Button

Press the STOP key once during a batch to pause. Press the STOP key while paused to stop and cancel the batch. Press the STOP key while in stop/ready mode cycle lower display values of rate (or other little display programmed parameter), grand total, batch count, and preset.



Only STOP Button Enabled if a Batch is Running

During a batch process, only the pause/stop functions of the STOP button will function. No other buttons will be functional.

Batch Control Operation Example

The following example shows how two stage batch control functions with an YPP6210 or YPP6310. This setup will establish a 55 gallon preset for the batch, with a main valve (high flow) that will close at 45 gallons, and a trickle valve (low or restricted flow) that will close at 55 gallons. After the batch, the preset will be changed to 100 gallons.

Two-Stage Batch Control Setup Using Relays 1 & 2

The following table shows the parameters as they appear within the *SEtUP* menu entry *rELAY*.

Parameter	Setting	Function
<i>rELAY</i>	<i>ASSIGN</i>	Press Enter to enter the relay assignment parameters.
<i>ASSIGN1</i>	<i>total</i>	Assign relay 1 to batch total control.
<i>ASSIGN2</i>	<i>total</i>	Assign relay 2 to batch total control.
<i>PRECLOSE total</i>		Press Enter to access preclose selection for multi-stage control.
<i>PRECLOSE</i>	<i>YES</i>	Yes to enable a preclose value for relay 2.
<i>YES</i>	<i>00005.0</i>	Set the preclose value to 5 for c; closing the valve controlling relay 2 five gallons before reaching the preset.
<i>...</i>		Assignment for optional relays 3-8.
<i>rLY 1 rELAY</i>		Select relay 1 setup.
<i>Act 1 rLY 1</i>		Configure activation of relay 1.
<i>Act 1</i>	<i>Auto</i>	Always set to Auto for batch control function.
<i>rLY 1</i>	<i>PRESET</i>	Set the preset value for batch control.
<i>PRESET</i>	<i>00055.0</i>	Set 55 gallons as the preset.
<i>...</i>		Setup for optional relays 3-8.

The operation of relay 2 has already been assigned for multi-stage control preclose, and will not appear as a selection in the *rELAY* menu. If only one stage batch control was desired, with one relay for control, then one would set the assignment of relay 2, *ASSIGN2*, to off, rate, or grand total.

The following pages show an illustration of how the above settings control the batch operation. The display assignment is the default.

Batch Control Operation

1. A new container is prepared for the batch. Both valves are closed. Note that the big display may show the batch total from the last batch.
2. The START button is pressed. Both valves open. The barrel begins to fill as the total being dispensed is displayed in the big window. The lower window shows the rate and units, alternating.
3. When the batch total reaches 60 gallons, the preset (55) minus the preclose amount (5) for relay 2, relay 2 deactivates to close the main valve. The barrel fills more slowly as a result, improving accuracy.
4. When the batch total equals the preset, relay 1 deactivates, closing valve 1. Filling stops.
5. The BATCH button is pressed, and a new preset is entered, 100 gallons, and the enter/STOP button is pressed to confirm it.
6. The new batch begins when the START button is pressed, so both relays activate and both valves open.

Additional Features

At any time during the batch, the STOP button may be pressed to pause the batch. When paused, the START button will continue the batch, and pressing the STOP button again will cancel the batch.

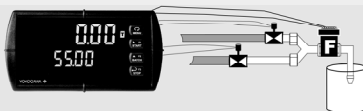
When in STOP mode, the STOP button may be pressed to cycle through alternative parameters to be displayed on the little display, including the grand total, batch count, and preset.

The grand total and batch count may be reset in the *RESET* menu by pressing the MENU button and entering the reset menu. It may also be reset with digital inputs.

MANUAL MULTI-STAGE BATCH CONTROL OPERATION

System Setup

- Both valves are closed with an empty barrel in place. The batched total is displayed in the upper display, the preset is selected for the lower display.



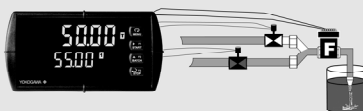
Batch Start

- The START button is pressed, with both valves open. The barrel begins to fill.



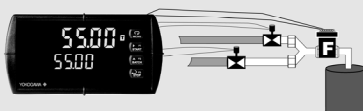
Preclose Valve

- When the batch total reaches a value of 50.00 (Preset[55.00] – Preclose[5.00]) the full-flow valve closes. The fill rate of the tank slows as a result.



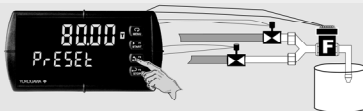
Completed Batch

- When the batch total equals the preset amount, the restricted-flow valve closes. The barrel is now full. If some overrun occurs, the next batch will adjust for this offset amount to maintain accuracy.



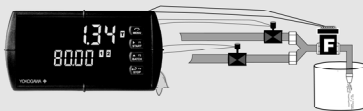
Change Preset

- After placing a new, empty barrel, a new preset fill amount may be selected with the BATCH key, while the process is stopped.



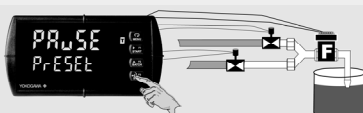
Begin New Batch

- Press the START key and a new batch will begin. With both valves open, the process continues.



Pause/Stop

- At any time, the STOP button may be pressed, once to Pause the process, or twice to cancel the batch, which stops the process.



VALVE KEY LEGEND



Display Functions and Messages

The controller displays various functions and messages during setup, programming, and operation. The following table shows the main menu functions and messages in the order they appear in the menu.

Display	Parameter	Action/Setting Description
<i>rESEt</i>	<i>Reset</i>	Press Enter to access the <i>Reset</i> menu
<i>rSt Hi</i>	<i>Reset high</i>	Press Enter to reset max display
<i>rSt Lo</i>	<i>Reset low</i>	Press Enter to reset min display
<i>rSt HL</i>	<i>Reset high & low</i>	Press Enter to reset max & min displays
<i>rSt t</i>	<i>Reset total</i>	Press Enter to reset total
<i>rSt Gt</i>	<i>Reset grand total</i>	Press Enter to reset grand total
<i>rSt bc</i>	<i>Reset batch count</i>	Press Enter to reset batch count
<i>Control</i>	<i>Control</i>	Enter <i>Control</i> menu
<i>Auto</i>	<i>Automatic</i>	Press Enter to set controller for automatic operation
<i>Man On</i>	<i>Manual</i>	Press Enter to manually control relays or analog output operation
<i>SEtUP</i>	<i>Setup</i>	Enter <i>Setup</i> menu
<i>inPUt</i>	<i>Input</i>	Enter <i>Input</i> selection menu
<i>mA R</i>	<i>4-20 mA</i>	YPP6210 Only: Set input for 4-20 mA input
<i>Volt</i>	<i>0-10 VDC</i>	YPP6210 Only: Set input for ± 10 VDC input
<i>total</i>	<i>Total</i>	Enable or disable totalizer features
<i>dEc Pt</i>	<i>Decimal point</i>	Set decimal point for rate, total, grand total
<i>ProG</i>	<i>Program</i>	Enter the <i>Program</i> menu
<i>SCALE</i>	<i>Scale</i>	Enter the <i>Scale</i> menu
<i>FAcTOR</i>	<i>K-factor Scaling</i>	YPP6310 Only: Programs unit to convert input pulse to rate in engineering units
<i>CAL</i>	<i>Calibrate</i>	Enter the <i>Calibrate</i> menu
<i>inP 1</i>	<i>Input 1</i>	Calibrate input 1 signal or program input 1 value

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
d 15 1	Display 1	Program display 1 value
inP 2	Input 2	Calibrate input 2 signal or program input 2 value (up to 32 points)
d 15 2	Display 2	Program display 2 value (up to 32 points)
Error	Error	Error, calibration not successful, check signal or programmed value
t tb	Total time base	Enter totalizer time base for seconds, minutes, hours or day.
t CF	Total conversion factor	Enter the conversion factor decimal point and the conversion factor.
nr odE	Batch mode	Automatic or manual batch control
t dLY	Time delay	Set time delay for automatic batch restart
gt tb	Grand total time base	Program grand total time base
gt CF	Grand total conversion factor	Program grand total conversion factor
gt rSt	Grand total reset	Program grand total reset mode: auto or manual
dSPLY	Display	Enter the <i>Display</i> menu
b G	Big display	Press Enter to assign the Main display parameter (default: PV or rate)
L tLE	Little display	Press Enter to assign the small display parameter (default: total)
d- InLY	Display intensity	Set display intensity level from 1 to 8
rELAY	Relay	Enter the <i>Relay</i> menu
R55 G	Assignment	Assign relays to rate, total (batch control), grand total, or Modbus controlled. Relays set to total function as batch control relays.
R5 G 1	Assign 1	Relay 1 assignment
PrEcL5	Batch total relay preclose	For relays beyond the first assigned to total, a preclose amount may be entered for that relay.
rLY 1	Relay 1	Relay 1 setup

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
Rct 1	Action 1	Set relay 1 action ¹
Ruto	Automatic	Set relay for automatic reset
R-nr Rn	Auto-manual ¹	Set relay for automatic & manual reset any time ¹
LRECH	Latching ¹	Set relay for latching operation (relays assigned to rate) ¹
Lt-Lr	Latching-cleared ¹	Set relay for latching operation with manual reset only after alarm condition has cleared (relays assigned to rate) ¹
RLtErn	Alternate ²	Set relay for pump alternation control (relays assigned to rate) ²
SRnr PL	Sampling	Set relay for sampling operation (rate or GT)
OFF	Off	Disable relay and front panel status LED (Select Off to enable Interlock feature)
SEt 1	Set 1	Program set point 1
rSEt 1	Reset 1	Program reset point 1
rLY 2	Relay 2	Relays 2-8 setup <i>Note: Relays 5-8 are shown, only if expansion relay module is installed.</i>
FRILSF	Fail-safe	Enter Fail-safe menu
FLS 1	Fail-safe 1	Set relay 1 fail-safe operation
on	On	Enable fail-safe operation
off	Fail-safe off	Disable fail-safe operation
dELAY	Delay	Enter relay Time Delay menu
dLY 1	Delay 1	Enter relay 1 time delay setup
On 1	On	Set relay 1 On time delay
OFF 1	Off	Set relay 1 Off time delay
brERH	Loop break	Set relay condition if loop break detected (For mA input only)
ignorE	Ignore	Ignore loop break condition (Processed as a low signal condition)
On	On	Relay goes to alarm condition when loop break is detected

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

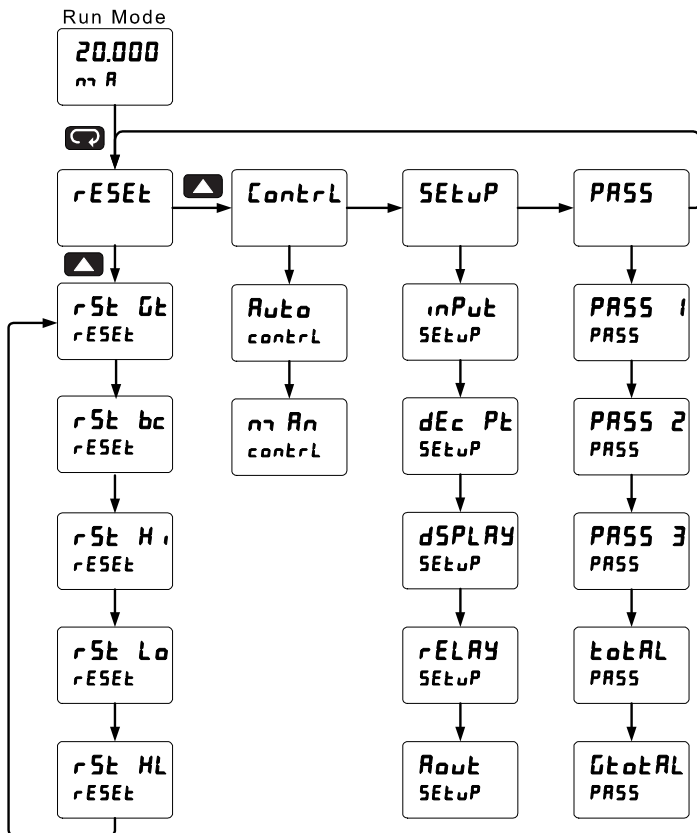
Display	Parameter	Action/Setting Description
<i>OFF</i>	<i>Off</i>	Relay goes to non-alarm condition when loop break is detected
<i>Rout</i>	<i>Analog output</i>	Enter the <i>Analog output</i> scaling menu
<i>d 1 1</i>	<i>Display 1</i>	Program display 1 value
<i>Out 1</i>	<i>Output 1</i>	Program output 1 value (e.g. 4.000 mA)
<i>d 1 2</i>	<i>Display 2</i>	Program display 2 value
<i>Out 2</i>	<i>Output 2</i>	Program output 2 value (e.g. 20.000 mA)
<i>PASS</i>	<i>Password</i>	Enter the <i>Password</i> menu
<i>PASS 1</i>	<i>Password 1</i>	Set or enter Password 1
<i>PASS 2</i>	<i>Password 2</i>	Set or enter Password 2
<i>PASS 3</i>	<i>Password 3</i>	Set or enter Password 3
<i>totAL</i>	<i>Total password</i>	Set or enter password for manual reset
<i>GrTotAL</i>	<i>Grand total password</i>	Set or enter password for manual reset
<i>nonr 5t</i>	<i>Non-resettable</i>	Non-resettable grand total set after entering "050873" for Gtotal password
<i>unLoc</i>	<i>Unlocked</i>	Program password to lock controller
<i>Locd</i>	<i>Locked</i>	Enter password to unlock controller
<i>999999</i> <i>-999999</i>	<i>Flashing display</i>	Overrange condition Underrange condition

1. During operation, only the STOP button will function, to stop/pause the batch. As a result, relay alarms cannot be manually reset.
2. This setting used for level control applications. It is not appropriate if using this controller for batching applications.

Main Menu Map

The main menu consists of the most commonly used functions: *Reset*, *Control*, *Setup*, and *Password*.

- Press Menu button when a batch is not running to enter Programming Mode then press the Up arrow button to scroll main menu.



- Press Menu, at any time, to exit and return to Run Mode. Changes made to settings prior to pressing Enter are not saved.
- Changes to the settings are saved to memory only after pressing Enter.
- The display moves to the next menu every time a setting is accepted by pressing Enter.

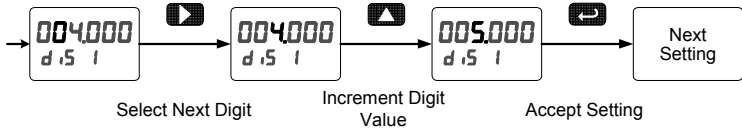
Setting Numeric Values

The numeric values are set using the Right and Up arrow buttons. Press Right arrow to select next digit and Up arrow to increment digit value.

The digit being changed is displayed brighter than the rest.

Press and hold up arrow to auto-increment the display value.

Press the Enter button, at any time, to accept a setting or Menu button to exit without saving changes.

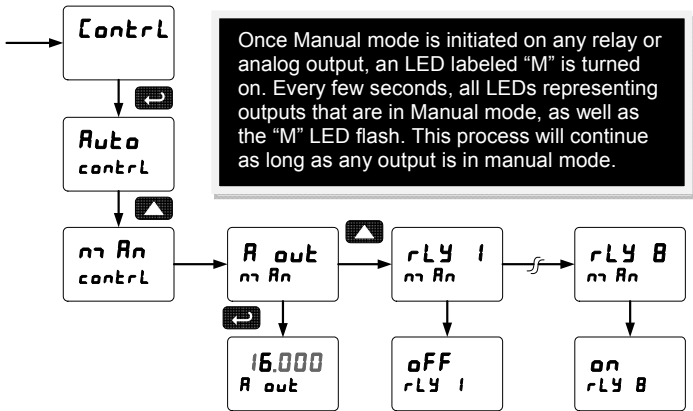


Reset Menu (rESEt)

The *Reset* menu is used to reset the total, grand totals, batch count, maximum, or minimum reading (peak or valley) reached by the process; both may be reset at the same time by selecting “reset high & low” (rSt HL).

Control Menu (ContrL)

The *Control* menu is used to control the 4-20 mA analog output and the relays manually, ignoring the input. Each relay and analog output can be programmed independently for manual control. Selecting automatic control sets all relays and analog output for automatic operation.



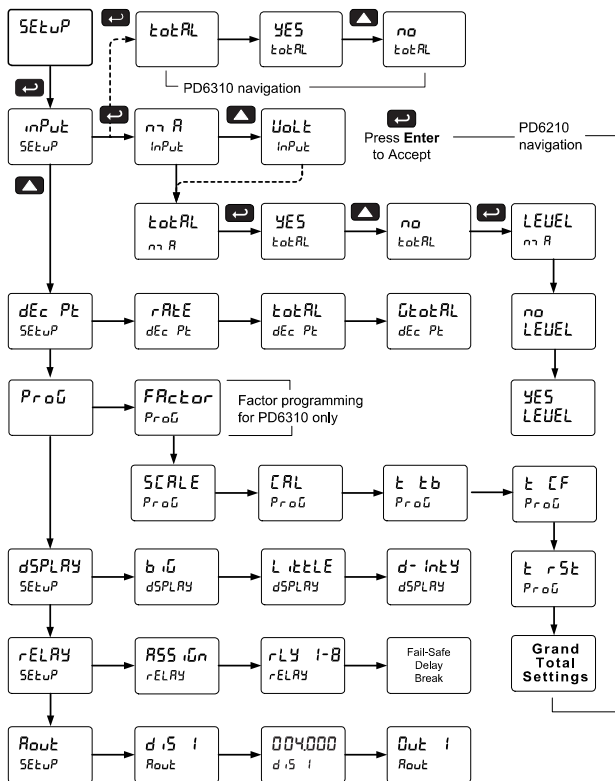
Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Setting Up the Batch Controller (SEtUP)

The *Setup* menu is used to select:

1. Input signal the controller will accept
2. Enable or disable totalizer and batching features
3. Decimal point position
4. Program menu for scaling or calibration
5. Display parameter and intensity
6. Relay operation
7. 4-20 mA analog output scaling

Press the Enter button to access any menu or press Up arrow to scroll through choices. Press the Menu button to exit at any time.



Scaling and Calibration

It is very important to read the following information, before proceeding to program the controller:

- There is **no need to recalibrate** the controller when first received from the factory.
- All inputs are factory calibrated. The calibration equipment used is certified to NIST standards.
- Use the *Scale* menu to enter the scaling without a signal source.
- Use the *Calibrate* menu to apply a signal from a calibrator or a flowmeter for the scaling.

Note: The *Scale* and *Calibrate* functions are exclusive of each other. The controller uses the last function programmed. Only one of these methods can be employed at a time. The *Scale* and *Calibrate* functions can use up to 32 points (default is 2). The number of points should be set in the *Advanced* menu under the Multi-Point Linearization (*LINEAR*) menu selection prior to scaling or calibration of the controller, see page 79 for details.

Setting the Input Signal (input)

YPP6210: Enter the *Input* menu to set up the controller to display current (*mA*) or voltage (*VDC*) inputs.

The current input is capable of accepting any signal from 0 to 20 mA. Select current input to accept 0-20 mA or 4-20 mA signals.

The voltage input is capable of accepting any signal from -10 to +10 VDC. Select voltage input to accept 0-5, 1-5, 0-10, or ± 10 VDC signals.

YPP6310: There are two switches, located to the right of the input connector, which must be configured according to the input level and type. Jumper J4 located inside the controller, behind the input signal connector, is used to select the excitation voltage (24 V*, 10 V or 5 V) which is supplied to the P+ and P- wiring terminals.

The controller may be calibrated using the *K-Factor* function. Most flowmeter manufacturers provide this information with the device. Enter the *K-Factor* (*K-Factor*) menu and select the decimal point with highest resolution possible and program the K-factor value (*i.e.* pulses/gal). The controller will automatically calculate the flow rate using the K-factor and the time base selected.

*Default setting

Setting the Totalizer and Batching Features (*totRL*)

After the input type is entered, set the *totRL* parameter to "YE5" to enable batch control (this is set by default). If the *totRL* features are disabled, all the batching features and functions are hidden from the menus.

Setting the Decimal Point (*dEc Pt*)

The decimal point may be set with up to five decimal places or with no decimal point at all. The rate, total, and grand total decimal points are independent.

Pressing the Right arrow moves the decimal point one place to the right until no decimal point is displayed then it moves to the leftmost position.

Programming the Rate/Totalizer (*Prog*)

It is **very important** to read the following information, before proceeding to program the controller:

YPP6210:

- The YPP6210 is factory calibrated prior to shipment to read in milliamps and volts depending on the input selection. The calibration equipment is certified to NIST standards.
- Use the *Scale* menu to scale process inputs (e.g. 4-20 mA). A calibrated signal source is not needed to scale the controller.

YPP6310

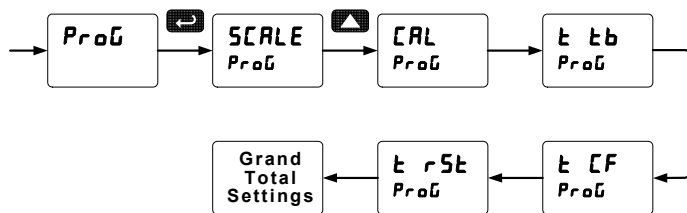
- The YPP6310 has been factory calibrated to read input frequency in Hz (pulses/sec). The calibration equipment is certified to NIST standards.
- Use the K-Factor menu to match the rate/totalizer with a flowmeter's k-factor (pulse/unit of measure).
- Or use the Scale menu to scale the pulse input (pulse/sec) without a signal source.
- Or use Cal menu to calibrate the rate/totalizer using a signal source.

The *Program* menu contains the following menus:

1. Scale without a signal source
2. Calibrate with a calibrated signal source
3. Total time base & conversion factor
4. Grand total time base & conversion factor
5. Total reset mode for total & grand total

Model YPP6210 & YPP6310 Batch Controllers **Instruction Manual**

The process inputs may be calibrated or scaled to any display value within the range of the controller.



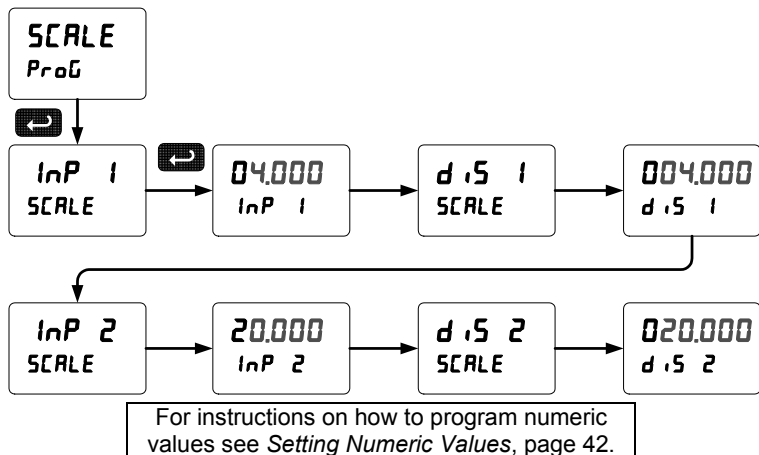
Additional parameters, not needed for most applications, are programmed in the *Advanced Features* menu; see **ADVANCED OPERATION AND PROGRAMMING**, page 69.

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Scaling the Controller (SCALE)

The process inputs (4-20 mA and ± 10 VDC) can be scaled to display the process variable in engineering units.

A signal source is not needed to scale the controller; simply program the inputs and corresponding display values.



Error Message (Error)

An error message indicates that the calibration or scaling process was not successful.

After the error message is displayed, the controller reverts to input 2 during calibration or scaling and to input 1 during internal calibration, allowing the appropriate input signal to be applied or programmed.

The error message might be caused by any of the following conditions:

1. Input signal is not connected to the proper terminals or it is connected backwards.
2. Wrong signal selection in *Setup* menu.
3. Minimum input span requirements not maintained.
4. Input 1 signal inadvertently applied to calibrate input 2.

Minimum Input Span

The minimum input span is the minimum difference between input 1 and 2 signals required to complete the calibration or scaling of the controller.

Input range	Input 1 & input 2 span
4-20 mA	0.15 mA
± 10 VDC	0.10 VDC

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Time Base, Total Conversion Factor & Total Reset

The time base, total conversion factor, and total reset menus are located in the *Program* menu.

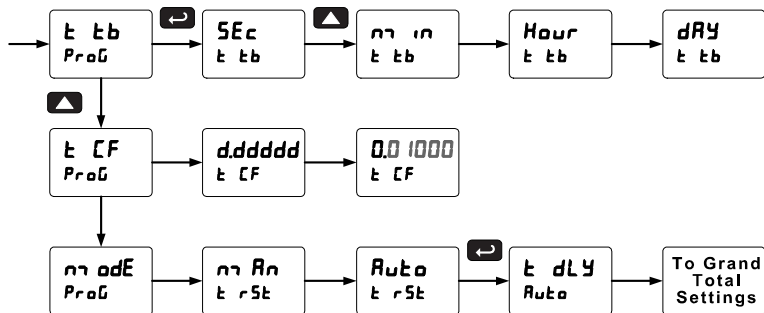
The total and grand total have their own independent settings. This means that one can be displaying the value in gallons while the other displays in million gallons, liters, m³, etc.

Batch Start Mode (הר אדE)

The batch controller may operate in manual or automatic mode. In manual mode, the controller operates as defined in Controller Operation as described on page 33. In automatic mode, the batch process will automatically begin after a completed batch. The time delay for the restart may be 0.1 to 999.9 seconds (ה דL י). Automatic batch start will only occur after a successful batch. A manually stopped batch will require a manual start to begin a new batch process.

Grand Total Reset

The grand total can be programmed for manual or automatic reset. In the automatic reset mode, a programmable time delay is available to reset the grand total after the assigned preset is reached.



Non-Resettable Totalizer

The total and grand total can be password-protected to prevent unauthorized resets. The grand total can be programmed as a non-resettable total, see page 67 for details.

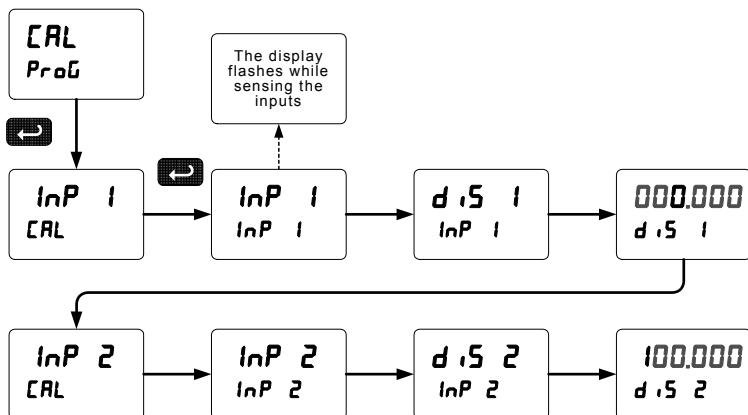
Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Calibrating the Controller with External Source (CAL)

To scale the controller without a signal source refer to Scaling the Controller (SCALE) page 47.

The controller can be calibrated to display the process variable in engineering units by applying the appropriate input signal and following the calibration procedure.

The use of a calibrated signal source is strongly recommended to calibrate the controller.



Warm up the controller for at least 15 minutes before performing calibration to ensure specified accuracy.

Setting the Display Parameter & Intensity (dSPLAY)

The main display (b iū) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values
5. Modbus input
6. Display rate and units

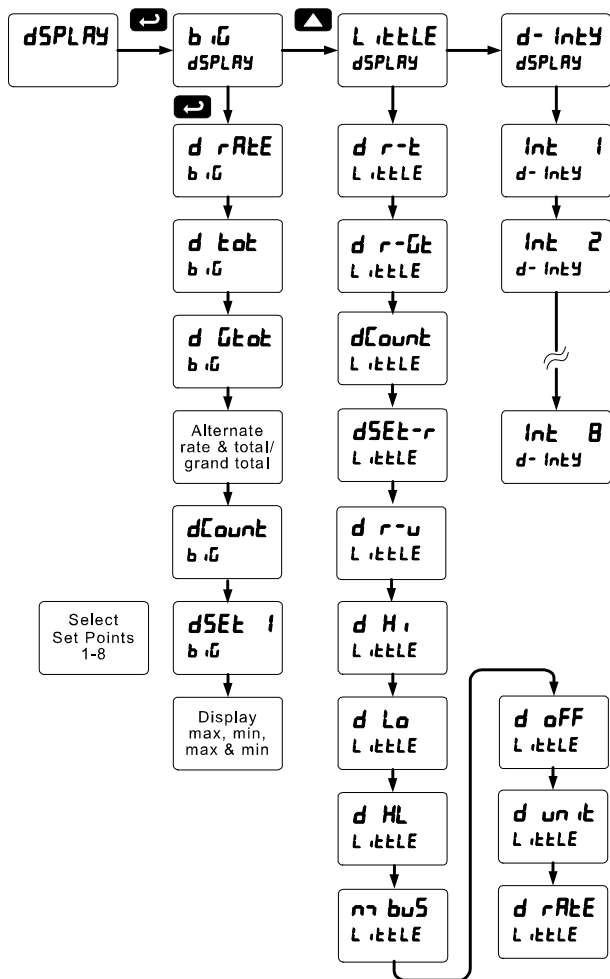
The small display (L iŁŁŁŁ) can be programmed to display:

1. Rate value
2. Total or grand total
3. Relay set points
4. Max & min values
5. Engineering units or custom legends
6. Modbus input
7. Off (no display)
8. Display rate and units

Display Intensity: The meter has eight display intensity levels to give the best performance under various lighting conditions. Select intensity 8 for outdoor applications.

For direct sunlight readability, Sunbright display models are highly recommended. See Ordering Information on page 7 for details.

Display Setup Menu



After setting up the input and the display, press the Menu button to exit programming and skip the rest of the setup menu. Press the Menu button again and the Up arrow to reach the *Program* menu and complete the scaling or calibration of the meter.

Character Set for Engineering Units Display (d unit)

The small display can be programmed to show engineering units or custom legends using the following 7-segment character set:

Display	Character
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	A
b	b
C	C
c	c
d	d
E	E
F	F
G	G
g	g
H	H
h	h
I	I
i	i
J	J

Display	Character
K	K
L	L
m	m
n	n
O	O
o	o
P	P
q	q
r	r
S	S
t	t
u	u
V	V
w	w
X	X
Y	Y
Z	Z
-	-
/	/
]]
[[
=	=
	Space
°	Degree

The letters “m” and “w” use two 7-segment LEDs each; when selected the characters to the right are shifted one position.

See the flow chart on page 44 to access the display units menu.

Press and hold up arrow to auto-scroll the characters in the display.

Setting the Relay Operation (*rELAY*)

This menu is used to set up the operation of the relays.

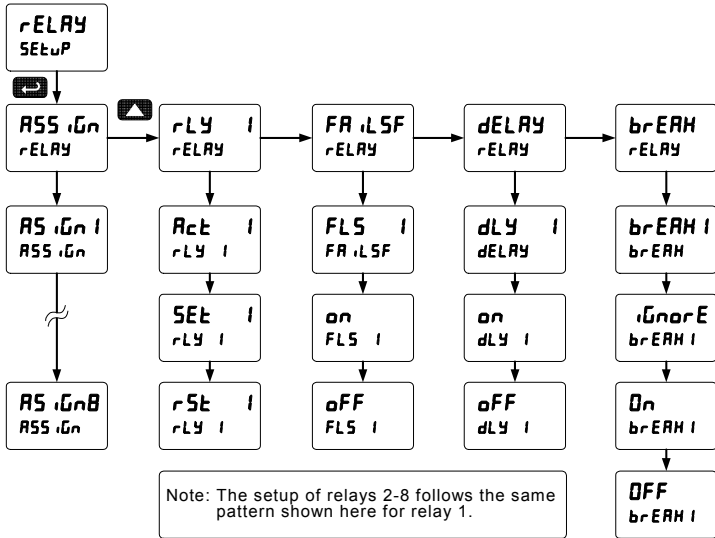
CAUTION! During setup, the relays do not follow the input and they will remain in the state found prior to entering the Relay menu.

1. Relay assignment
 - a. Rate for low and high alarm
 - b. Total for batch control relays
 - c. Grand total for grand total alarms
2. Relay action
 - a. Automatic reset only (non-latching)
 - b. Automatic + manual reset when not in a batch process (non-latching)
 - c. Latching (manual reset when not in a batch process only)
 - d. Latching with Clear (manual reset when not in a batch process only after alarm condition has cleared)
 - e. Pump alternation control (automatic reset only, for level applications unrelated to batch control)
 - f. Sampling (the relay is activated for a user-specified time and may be assigned to rate or grand total)
 - g. Off (relay state controlled by Interlock feature)
3. Set and reset points
4. Fail-safe operation
 - a. On (enabled)
 - b. Off (disabled)
5. Time delay
 - a. On delay (0-999.9 seconds)
 - b. Off delay (0-999.9 seconds)
6. Relay action for loss (break) of 4-20 mA input (ignore, on, off)



Rate Alarms Only Active During a Batch Process

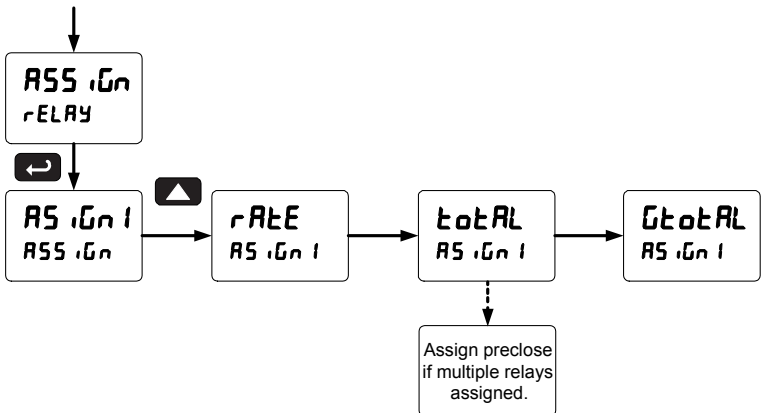
The rate alarms are active only during a batch process. As a result, rate alarms should not be programmed with manual reset, as they cannot be manually reset during a batch process, the only time they are active.



Relay Assignment (ASS iGn)

The relays can be assigned to any of the following parameters:

1. Rate for low or high alarm indication
2. Total for batch control relays
3. Grand total for alarm indication



Setting the Relay Action

Operation of the relays is programmed in the *Action* menu. The relays are commonly set up for any of the following modes of operation:

1. Always set to Auto for Batch control operation. Also for automatic reset (non-latching) of alarms.
2. Sampling (the relay is activated for a user-specified time)
3. Off (relay state controlled by Interlock feature)

In addition, the following relay actions may be programmed. These actions are not appropriate for batch control applications, but may be used when the controller is in other applications.

4. Automatic + manual reset when not in a batch process (non-latching)
5. Latching (manual reset only, when not in a batch process)
6. Latching with Clear (manual reset only when not in a batch process after alarm condition has cleared)
7. Pump alternation control (automatic reset only, for level applications, unrelated to batch control.)

Setting Batch Control Relays

Operation of batch control relays are programmed in the *Action* menu by selecting *EOEL* as the action. Relays set to *EOEL* beyond the first will include a preclose parameter (*PRECLS*) option. Selecting *YES* for *PRECLS* will enable multi-stage batching with preclose, and the valve will close prior to the end of the batch at volume equal to the preset value minus the preclose amount entered. Selecting *NO* for *PRECLS* will have the relay perform as normal, independent of the first batch control relay set to *EOEL*.

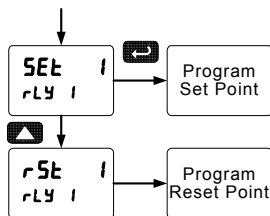
Programming Alarm Set and Reset Points

High alarm indication: program set point above reset point.

Low alarm indication: program set point below reset point.

The deadband is determined by the difference between set and reset points. Minimum deadband is one display count. If the set and reset points are programmed with the same value, the relay will reset one count below the set point.

Note: Changes are not saved until the reset point has been accepted.



Setting Fail-Safe Operation

In fail-safe mode of operation, the relay coil is energized when the process variable is within safe limits and the relay coil is de-energized when the alarm condition exists. The fail-safe operation is set independently for each relay. Select **on** to enable or select **off** to disable fail-safe operation.

Programming Time Delay

The *On* and *Off* time delays may be programmed for each relay between 0 and 999.9 seconds. The relays will transfer only after the condition has been maintained for the corresponding time delay.

The *On* time delay is associated with the set point.

The *Off* time delay is associated with the reset point.

Relay Action for Loss of 4-20 mA Input (Loop Break)

The loop break feature is associated with the 4-20 mA input. Rate alarm relays may be programmed to go to one of the following conditions when the controller detects the loss of the input signal (i.e. < 0.005 mA):

1. Turn *On* (Go to alarm condition)
2. Turn *Off* (Go to non-alarm condition)
3. Ignore (Process as a low signal condition)

Note: This is not a true loop break condition; if the signal drops below 0.005 mA, it is interpreted as a "loop break" condition.

Relay Operation Details

Overview

The relays of the controller can serve two roles, as batch control relays for single or multi-stage batching, as rate, or grand total alarm, or as a sampling relay based on grand total or rate alarm.

These capabilities include front panel alarm status LEDs and 2 or 4 internal relays and/or 4 external relays expansion module.

The relays used for batch control (total) are activated when the batching process starts, and deactivate when the batch total is reached, minus any preclose amount programmed for batch (total) relays after the first.

For an example of batch control operation, see Batch Control Operation Example on page 34.

Typical applications for alarms are low and high flow alarms or grand total limit alarms. Note that rate alarms are only enabled during a batching process, and deactivate when the processes is stopped.

The relays can also be set for sampling, where the relay will activate for a specific amount of time after a certain grand total has been reached (ie: 2 second sample relay activation every 100 gallons batched).

There are three basic ways the relays can be used:

1. Batch Control (Total)
2. High or Low Alarms for Rate or Grand Total
3. Sampling (Based on Grand Total and Sample Time)

Relays Initialization

Batch control (total) relays will activate when the start function is enabled, such as when the START button is pressed. Rate alarm relays will enable and initialize to their programmed states when the batch process is started. Grand total alarm relays will initialize to their programmed state at controller power-up.

Fail-Safe Operation

The following table indicates how alarm relays behave based on the fail-safe selection for each relay:

Fail-Safe Selection	De-Energized State		Energized State		Power Failure
	NO	NC	NO	NC	
Off	Open	Closed	Closed	Open	Relays in de-energized state
On	Closed	Open	Open	Closed	Relays in energized state

Note: NO = Normally Open, NC = Normally Closed. This refers to the condition of the relay contacts when the power to the controller is off.

Front Panel LEDs

The LEDs on the front panel provide status indication for the following:

LED	Status
1	Alarm 1
2	Alarm 2
3	Alarm 3
4	Alarm 4

LED	Status
5	Alarm 5
6	Alarm 6
7	Alarm 7
8	Alarm 8

The controller is supplied with four alarm points that include front panel LEDs to indicate alarm conditions. This standard feature is particularly useful for alarm applications that require visual-only indication. The LEDs are controlled by the set and reset points programmed by the user. When the display reaches a set point for a high or low alarm, the corresponding alarm LED will turn on. When the display returns to the reset point the LED will go off. Note that rate alarms are only enabled during a batching process, and deactivate when the processes is stopped.

Latching relays, or relays with manual reset, are not recommended when using this controller for batch control, as the manual reset will not be acknowledged during a batch process, when the rate alarms are active. For information on latching and manual reset alarms, see the YPP6200 and YPP6300 instruction manuals available at www.yokogawa-usa.com.

Automatic Reset (Auto)

Automatic reset only

Condition	LED	Relay
Normal	Off	Off
Alarm	On	On
Ack (No effect)	On	On
Normal	Off	Off

In this application, the controller is set up for automatic reset (non-latching relay). Acknowledging the alarm while it is still present has no effect on either the LED or the relay. When the alarm finally goes away, the relay automatically resets and the LED also goes off.

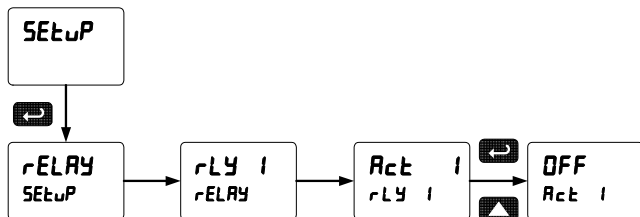
Pump Alternation Control

Pump alternation control is not recommended when using this controller for batch control, as it is used only in level applications, and not with rate, total, or batching applications. For information on using pump alternation control for level, see the YPP6200 and YPP6300 instruction manuals available at www.yokogawa-usa.com.

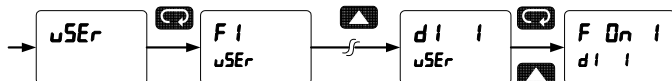
Setting Up the Interlock Relay (Force On) Feature

Relays 1-4 can be set up as interlock relays. To set up the relays for the interlock feature:

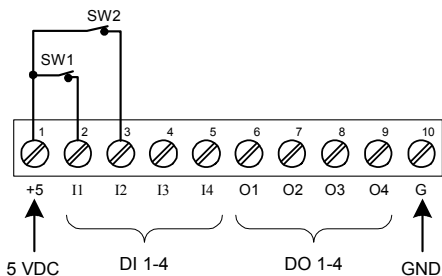
1. Access the *Setup – Relay – Assign the relay to grand total.*



2. In the Advanced features – *User* menu program any of the digital inputs to *Force On* any of the internal relays (1-4).



3. Connect a switch or dry contact between the +5V terminal and the corresponding digital input (dl-1 to dl-4) terminal.



Interlock Relay Operation Example

Relays 3 & 4 are configured to energize (their front panel LEDs are off) when SW1 & SW2 switches (above) are closed. If the contacts to these digital inputs are opened, the corresponding front panel LEDs flash indicating this condition. The processes being controlled by the interlock relay will stop, and will re-start only after the interlock relay is re-activated by the digital inputs (switches).

Sample Relay Operation

The sampling function allows the operator to set a set point for a “sampling” relay. This can be done for the rate or the grand total. Each time the relay reaches the set point, it will close that relay’s contacts for a programmed period of time

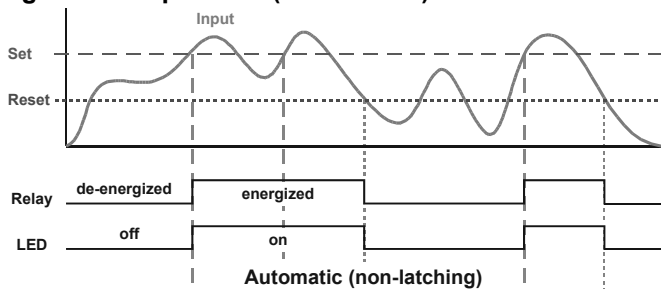
A rate sampling relay will activate for the sample time ($SR_{RT} \cdot t$), up to 600.0 seconds, every time the set point rate is reached.

A total sampling relay will activate for the sample time ($SR_{RT} \cdot t$), up to 600.0 seconds every time the process has batched the amount programmed for the set point, and every time this amount has been batched afterward. (See the diagram below for more details). The utility of this function can, of course, be expanded beyond sampling and be used whenever a timed relay output closure is required when the batch total interval reaches a certain set point.

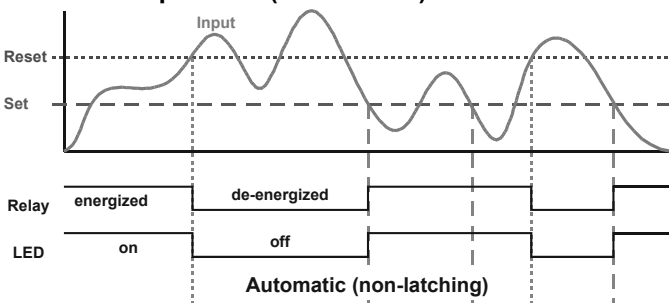
Relay and Alarm Operation Diagrams

The following graphs illustrate the common operation of the relays, status LEDs, and ACK button.

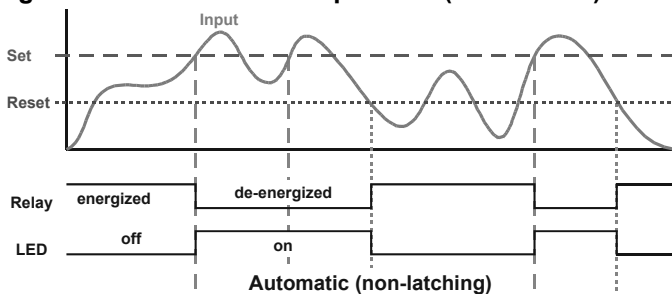
High Alarm Operation (Set > Reset)



Low Alarm Operation (Set < Reset)

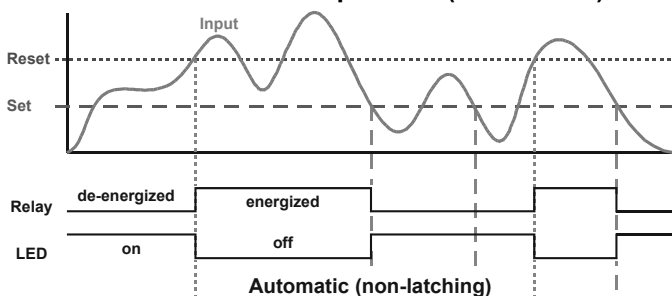


High Alarm with Fail-Safe Operation (Set > Reset)



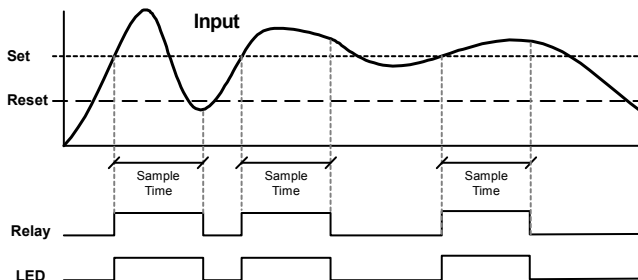
*Note: Relay coil is energized in non-alarm condition.
In case of power failure, relay will go to alarm state.*

Low Alarm with Fail-Safe Operation (Set < Reset)



*Note: Relay coil is energized in non-alarm condition.
In case of power failure, relay will go to alarm state.*

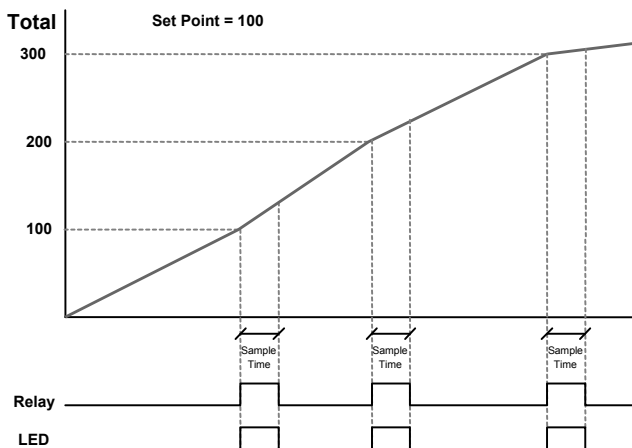
Rate Relay Sampling Operation



When the signal crosses the set point, the relay trips and the sample time starts. After the sample time has elapsed, the relay resets. The cycle repeats every time the set point is crossed, going up for high alarms and going down for low alarms.

The sample time can be programmed between 0.1 and 600.0 seconds.

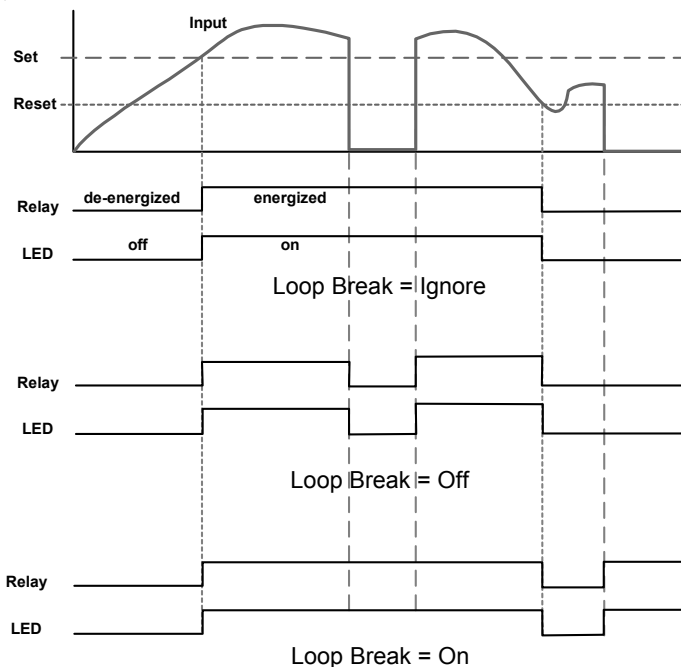
Total Relay Sampling Operation



When the batch total reaches the set point, the relay trips and the sample time starts. After the sample time has elapsed, the relay resets. The cycle repeats every time the set point value is added to the batch total.

Signal Loss or Loop Break Relay Operation

The following graph shows the loop break operation for a high alarm relay.

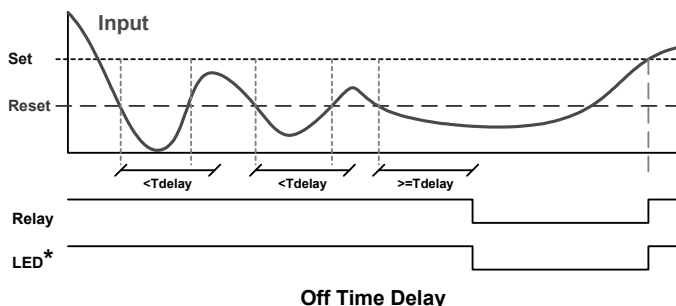
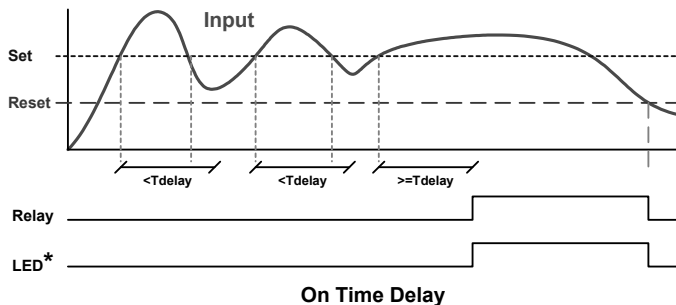


When the controller detects a break in the 4-20 mA loop, the relay will go to one of the following selected actions:

1. Turn on (Go to alarm condition)
2. Turn off (Go to non-alarm condition)
3. Ignore (Process as a low signal condition)

Time Delay Operation

The following graphs show the operation of the time delay function.



When the signal crosses the set point, the *On* time delay timer starts and the relay trips when the time delay has elapsed. If the signal drops below the set point (high alarm) before the time delay has elapsed, the *On* time delay timer resets and the relay does not change state. The same principle applies to the *Off* time delay.

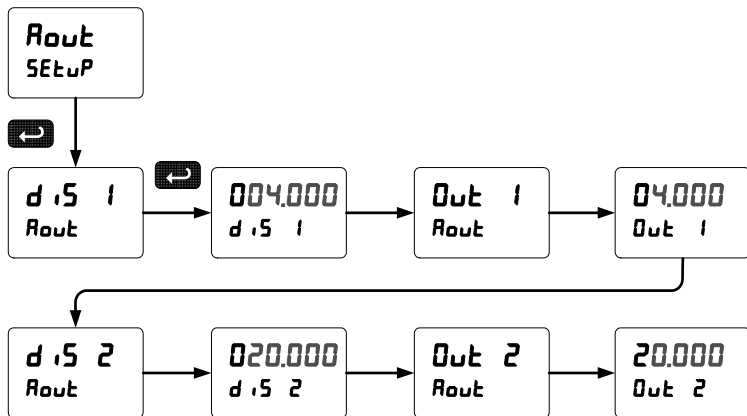
* Note: If “*Automatic or Manual (R-nn Rn)*” reset mode is selected, the LED follows the reset point and not the relay state when the relay is acknowledged.

Scaling the 4-20 mA Analog Output (*Rout*)

The 4-20 mA analog output can be scaled to provide a 4-20 mA signal for any display range selected.

No equipment is needed to scale the analog output; simply program the display values to the corresponding mA output signal.

The *Analog Output* menu is used to program the 4-20 mA output based on display values.



For instructions on how to program numeric values see *Setting Numeric Values*, page 42.

Setting Up the Password (PASS)

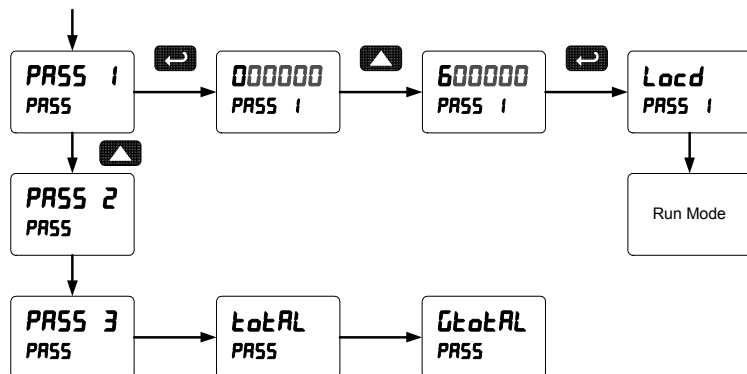
The *Password* menu is used for programming three levels of security to prevent unauthorized changes to the programmed parameter settings and to program the non-resettable totalizer.

Pass 1: Allows use of function keys and digital inputs
 Pass 2: Allows use of function keys, digital inputs and editing set/reset points
 Pass 3: Restricts all programming, function keys, and digital inputs.
 Total Password: Prevents resetting the total manually
 Gtotal Password: Prevents resetting the grand total manually

Protecting or Locking the Controller

Enter the *Password* menu and program a six-digit password.

For instructions on how to program numeric values see *Setting Numeric Values*, page 42.



Record the password for future reference. If appropriate, it may be recorded in the space provided.

Model:	
Serial Number:	
Password 1:	_____
Password 2:	_____
Password 3:	_____
Total	_____
GTotal	_____

Grand Total Reset Password & Non-Resettable Total

The grand total can be password-protected to prevent unauthorized total resets.

The grand total can be programmed as a non-resettable total by entering the password "050873".



Caution!

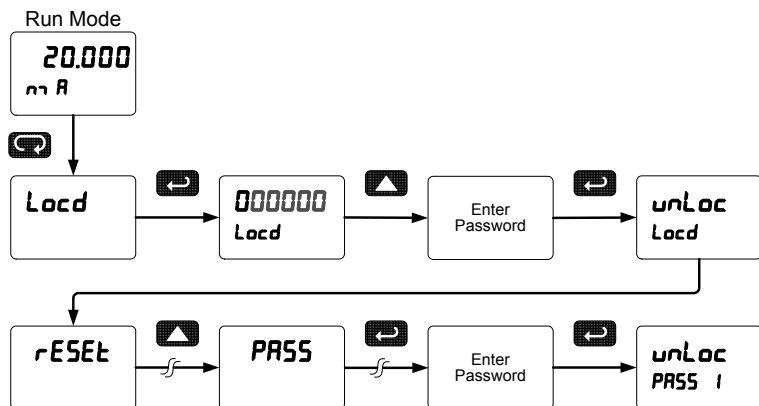
Once the Grand Total has been programmed as "non-resettable" the feature **cannot** be disabled.

Making Changes to a Password Protected Controller

If the controller is password protected, the controller will display the message *L o c k* (*Locked*) when the Menu button is pressed. Press the Enter button while the message is being displayed and enter the correct password to gain access the menu. After exiting the programming mode, the controller returns to its password protected condition.

Disabling Password Protection

To disable the password protection, access the *Password* menu and enter the correct password twice, as shown below. The controller is now unprotected until a new password is entered.



If the correct six-digit password is entered, the controller displays the message *unLoc* (unlocked) and the protection is disabled until a new password is programmed.

If the password entered is incorrect, the controller displays the message *Locd* (Locked) for about two seconds, and then it returns to Run Mode. To try again, press Enter while the *Locked* message is displayed.

Did you forget the password?

The password may be disabled by entering a master password once. If you are authorized to make changes, enter the master password 508655 to unlock the controller.

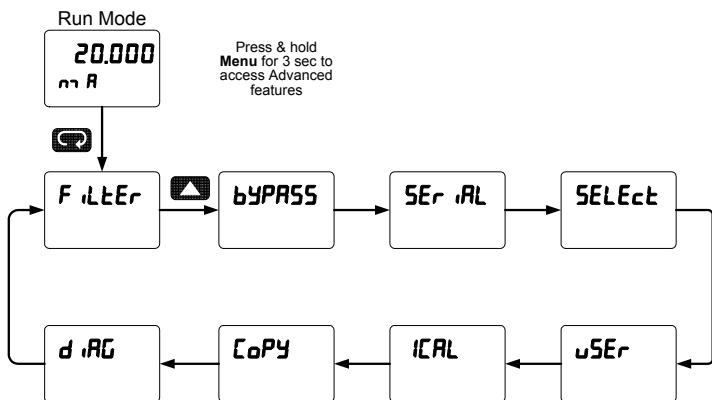
ADVANCED OPERATION AND PROGRAMMING

In addition to the functions described in Controller Operation on page 33, the following advanced operation and display features may be programmed. Configuring these features may disable some default batch controller features, or make running a batch operation impossible. These functions should only be used by users who are sure of their need in their application.

Advanced Features Menu

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features* menu.

Press and hold the Menu button for three seconds to access the advanced features of the controller. This cannot be done during a back process as all functions other than STOP are disabled during a batch process, including the Menu button.



Advanced Features Menu & Display Messages

The following table shows the functions and messages of the *Advanced Features* menu in the order they appear in the menu.

Display	Parameter	Action/Setting
<i>F ILT</i>	<i>Filter</i>	Set noise filter value
<i>bYPASS</i>	<i>Bypass</i>	Set filter bypass value
<i>SERIAL</i>	<i>Serial</i>	Set serial communication parameters
<i>SLAVE ID</i>	<i>Slave ID</i>	Set slave ID or controller address
<i>BAUD</i>	<i>Baud rate</i>	Select baud rate
<i>TR DELAY</i>	<i>Transmit delay</i>	Set transmit delay for serial communication
<i>PARITY</i>	<i>Parity</i>	Select parity Even, Odd, or None with 1 or 2 stop bits
<i>t-byte</i>	<i>Time byte</i>	Set byte-to-byte timeout
<i>SELECT</i>	<i>Select</i>	Enter the Select menu (function, cutoff, out)
<i>FUNCTION</i>	<i>Signal Input Conditioning</i>	Select linear, square root, or programmable exponent
<i>LINEAR</i>	<i>Linear</i>	Set controller for linear function and select number of linearization points
<i>NOPTS</i>	<i>Number of points</i>	Set controller for 2 to 32-point linearization
<i>SQRRT</i>	<i>Square root</i>	Set controller for square root extraction
<i>PROG E</i>	<i>Programmable exponent</i>	Set controller for programmable exponent and enter exponent value
<i>CUTOFF</i>	<i>Cutoff</i>	Set low-flow cutoff
<i>COUNT</i>	<i>Count</i>	Set the totals to count up or down from a set value
<i>tot C</i>	<i>Total count</i>	Set the batch to count up to or down from the preset
<i>Gr tot C</i>	<i>Grand total count</i>	Set the grand total to count up or down from a defined value
<i>C Start</i>	<i>Count start</i>	Set the starting grand total value when counting down
<i>ROUTPR</i>	<i>Analog output programming</i>	Program analog output parameters
<i>SOURCE</i>	<i>Source</i>	Select source for the 4-20 mA output

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting
0-rRnG	<i>Overrange</i>	Program mA output for display overrange
u-rRnG	<i>Underrange</i>	Program mA output for display underrange
brERH	<i>Loop Break</i>	Set relay condition if loop break detected
ForcE	<i>Force output</i>	Force analog output value for loop break
iGnorE	<i>Ignore</i>	Ignore loop break condition
n RH	<i>Maximum</i>	Program maximum mA output allowed
n n	<i>Minimum</i>	Program minimum mA output allowed
CRL 0	<i>Calibrate</i>	Calibrate 4-20 mA output (internal reference source used for scaling the output)
4 n R	<i>4 mA output</i>	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
20 n R	<i>20 mA output</i>	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
uSEr	<i>User I/O</i>	Assign function keys and digital I/O
F 1	<i>F1 function key</i>	Assign F1 function key
F2	<i>F2 function key</i>	Assign F2 function key
F3	<i>F3 function key</i>	Assign F3 function key
d 1 1	<i>Digital input 1</i>	Assign digital input 1 – 8, if expansion modules are connected
d0 1	<i>Digital output 1</i>	Assign digital output 1 – 8, if expansion modules are connected
iCRL	<i>Internal source calibration</i>	Enter internal source calibration (used for scaling the controller without a signal source)
C CRL	<i>Current calibration</i>	Calibrating 4-20 mA current input (internal reference source used for scaling the input)
C Lo	<i>Current low</i>	Calibrate low current input (e.g. 4 mA)
C Hi	<i>Current high</i>	Calibrate high current input (e.g. 20 mA)
U CRL	<i>Voltage calibration</i>	Calibrating voltage input
U Lo	<i>Voltage low</i>	Calibrate low voltage input (e.g. 0 V)
U Hi	<i>Voltage high</i>	Calibrate high voltage input (e.g. 10 V)
CoPY	<i>Copy</i>	Enter copy function

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting
SEnd	Send	Send controller settings to another controller
donE	Done	Copy function completed
d iAG	Diagnostics	Display parameter settings
inPut	Input	Input selection
F iLEr	Filter	Set noise filter level
bYPASS	Bypass	Set filter bypass level
FunctiOn	Function	Function selected
SCALE	Scale	Scaling parameter
FRactor	K-factor	K-factor value
GAte	Gate	Gate settings
CuToFF	Cutoff	Cutoff value
t tB	Total time base	Set time period
t CF	Total correction factor	Set correction factor
on oDE	Batch mode	Automatic or manual batch start
t dELAY	Time delay	Set time delay for automatic batch restart
GT tB	Grand total time base	Set grand total time period
GT CF	GT correction factor	Set grand total correction factor
GT rSE	Grand total	Set grand total reset method
dSPLY	Display	Display assignments
rELAY	Relays	Relay settings
RoUt	Analog output	Analog output scaling
RoUtPr	Analog output programming	Analog output programming
LEd t	LED test	Test all LEDs
inFo	Information	Display software information

Function Keys Operation

During operation, the programmable function keys operate according to the way they have been programmed in the *Advanced Features – User* menu. The following table shows the default setting for each of the function keys.

Function Key/Button	Default Setting	Action
F1/START	StArT	Start batch
F2/BATCH	PrESEt	Change preset
F3/STOP	StoP	Pause/stop batch



Only STOP Operation Enabled if a Batch is Running.

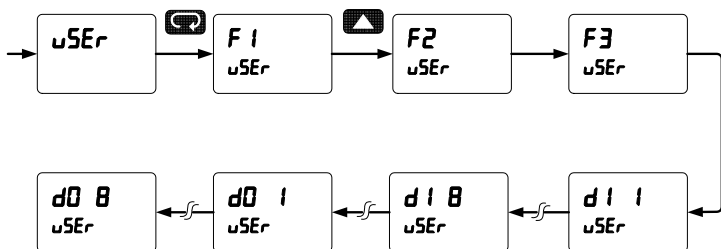
During a batch process, the only function that can be performed is the pause/stop functions of the STOP button; the default programming of the F3 key. No other functions, including min/max display, manual alarm reset, or total reset, will function while a batch is running.

Programmable Function Keys User Menu (uSEr)



Changing the programming of the F1-F3 function keys will disable the default batch operation of these keys, and is not recommended for batch control applications.

The *User* menu allows the user to assign the front panel function keys F1, F2, F3 and up to eight digital inputs to access most of the menus or to activate functions immediately (e.g. Reset max & min). Up to eight digital outputs can be assigned to a number of actions and functions executed by the controller (e.g. Alarms, relay acknowledgement, etc.).



Function Keys & Digital I/O Available Settings

Display	Description	Display	Description
5tRrt	Start batch	L it Gt	GT on little display
5toP	Pause/stop batch	L it bc	Batch count display
5rt5tP	Start/stop combo	d ,5RbL	Disable input/button
rLY d	Disable all relays	n Enu	Enter menu (DI only)
rLY E	Enable all relays	r iGht	Right/F1(DI only)
G Hold	Output level hold	uP	Up/F2 (DI only)
d Hold	Display hold	EntEr	Enter/F3 (DI only)
b iG Hi	Max on big display	RcH	Acknowledge relays
b iG Lo	Min on big display	r5t t	Reset total
b iG HL	Max/min on big display	r5t Gt	Reset grand total
L it Hi	Max on little display	r5t bc	Reset batch count
L it Lo	Min on little display	r5t Hi	Reset max
L it HL	Max/min little display	r5t Lo	Reset min
F On 1	Force relay 1 on	r5t HL	Reset max & min
F On 2	Force relay 2 on	rELRY	Relay menu
F On 3	Force relay 3 on	PrESEt	Change preset
F On 4	Force relay 4 on	5Et 2	Set point 2 – 8

Advanced Setup and Calibration
Multi-Point Calibration & Scaling

The controller is set up at the factory for 2-point linear calibration. The number of points for multi-point calibration/scaling is set up in the *Advanced Features* menu. Up to 32 linearization points may be selected. See page 79 for details.

PROPLUS Software

The controller can be programmed and operated using the PC-based **PROPLUS** software available for free download at www.yokogawa-usa.com. Batches may be started, paused, and stopped, through the monitoring window of the **PROPLUS** software. Preset and preclose values may be changed, and the total and grand total reset.

Data logging for one controller at the time is available with **PROPLUS** software. More advanced data acquisition may be accomplished by using any Modbus RTU compliant software.

In order to operate or program the batch controller using a computer, the controller must be connected using a USB, RS-232, or RS-485 serial adapter, see Accessories on page 8 for details.

Maximum/Minimum Readings

The max & min readings (peak & valley) reached by the process can be displayed either continuously or momentary:

1. Display briefly by assigning to the digital inputs in the *User* menu.
2. Display continuously by assigning either display to max/min through the *Display* menu.

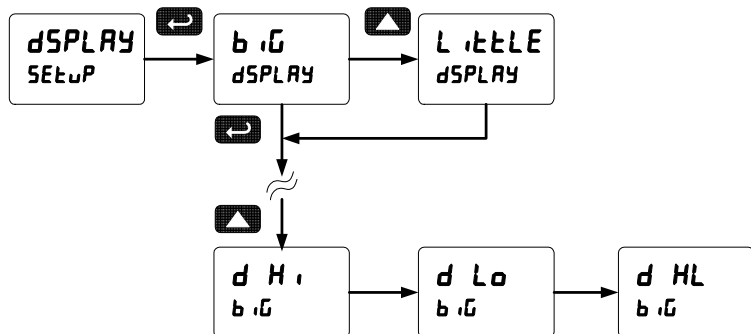


Changing the programming of the F1-F3 function keys will disable the default batch operation of these keys, and is not recommended for batch control applications.

Any of the digital inputs can be programmed to reset the max & min readings.

To display max/min readings continuously:

Assign either display to Max (d H i), Min (d L o), or toggle between Max and Min (d H L) every 10 seconds.



Note that changing default the programming of the big or little displays will interfere with seeing the batch total (upper display) or rate (lower display) of the batch process.

Total and Grand Total Count Direction (COUNT)

By default, the batch total and grand total count up during batch processes. COUNT parameter allows this to change. When set to count down, the batch total will count down from the preset to 0. When set to count down, the grand total will count down from a set value up to 999,999.

Noise Filter (FILTER)

The noise filter is available for unusually noisy signals that cause an unstable process variable display. The noise filter averages the input signal over a certain period. The filter level determines the length of time over which the signal is averaged. The filter level can be set between 2 and 199. The higher the filter level, the longer the averaging time and so the longer it takes the display to settle to its final value. Setting the filter level to zero disables the filter function.

Noise Filter Bypass (BYPASS)

The noise filter bypass changes the behavior of the controller so that small variations in the signal are filtered out but large abrupt changes in the input signal are displayed immediately. The bypass value determines the minimum amount of signal change to be displayed immediately. All signal changes smaller than the bypass value are filtered or averaged by the controller. The noise filter bypass may be set between 0.1 and 99.9% of full scale.

Modbus RTU Serial Communications (SEr ,AL)

The controller is equipped with serial communications capability as a standard feature using Modbus RTU Serial Communication Protocol.

To communicate with a computer or other data terminal equipment, an RS-232, RS-485, or USB adapter option is required; see *Ordering Information* on page 7 for details.

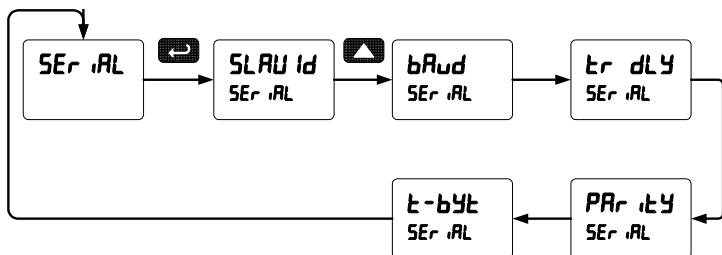


Warning!

Do not connect any equipment other Yokogawa's expansion modules, cables, or controllers to the RJ45 M-LINK connector. Otherwise damage will occur to the equipment and the controller.

Note: More detailed instructions are provided with each optional serial communications adapter.

*Note: Refer to the **PROPLUS** Modbus Register Tables located at www.yokogawa-usa.com for details.*

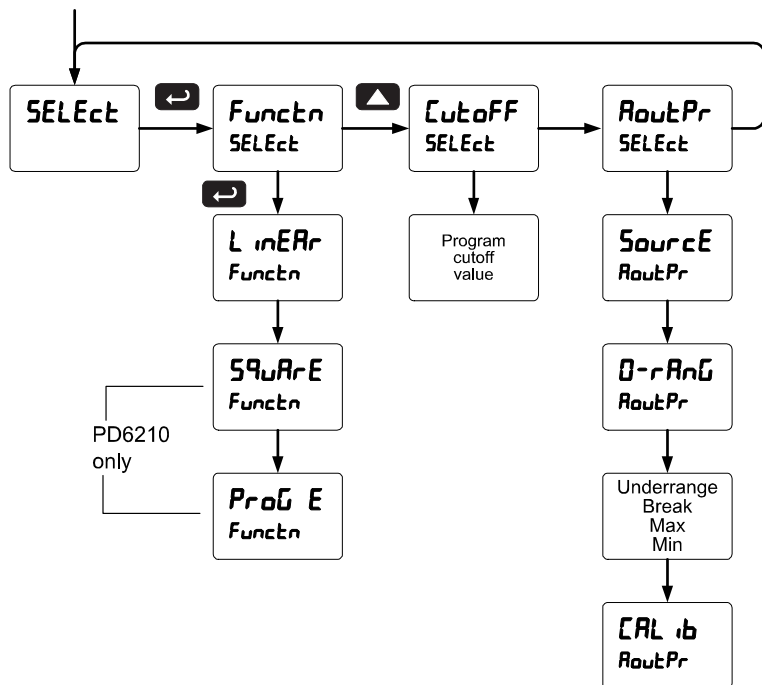


When using more than one controller in a multi-drop mode, each controller must be provided with its own unique address. The controller address (Slave ID) may be programmed between 1 and 247. The transmit delay may be set between 0 and 199 ms. The parity can be set to even, odd, or none with 1 or 2 stop bits.

The YPP6210 can also be connected to another YPP6210 with a special YPPA1200 cable, allowing the user to copy all the settings from one controller to another, using the *Copy* function.

Select Menu (SELEct)

The *Select* menu is used to select the signal input conditioning applied to the input (linear, square root, or programmable exponent, low-flow cutoff, and analog output programming). The multi-point linearization is part of the linear function selection.



Signal Conditioning Selection (Functn)

The *Function* menu is used to select the signal conditioning function applied to the input: linear, square root, or programmable exponent. The multi-point linearization is part of the linear function selection.

Controllers are set up at the factory for linear function with 2-point linearization. The linear function provides a display that is linear with respect to the input signal.

Square Root Linearization (SQUR E)

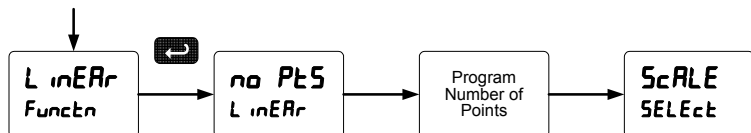
The square root function can be used to linearize the signal from a differential pressure transmitter and display flow rate in engineering units.

Programmable Exponent Linearization (PROG E)

The programmable exponent can be used to linearize the signal from level transmitters in open-channel flow applications using weirs and flumes.

Multi-Point Linearization (LINEAR)

Controllers are set up at the factory for linear function with 2-point linearization. Up to 32 linearization points can be selected under the linear function. The multi-point linearization can be used to linearize the display for non-linear signals such as those from level transmitters used to measure volume in odd-shaped tanks or to convert level to flow using weirs and flumes with complex exponent.

**Low-Flow Cutoff (CUTOFF)**

The low-flow cutoff feature allows the controller to be programmed so that the often-unsteady output from a differential pressure transmitter, at low flow rates, always displays zero on the controller.

The cutoff value may be programmed from 0 to 999999. The controller will display zero below the cutoff value. Programming the cutoff value to zero disables the cutoff feature.

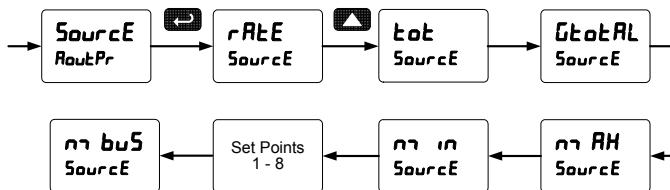
Analog Output Programming (RoutPr)

The *Analog Output Programming* menu is used to program the behavior of the 4-20 mA output. The following parameters and functions are programmed in this menu:

1. Source: Source for generating the 4-20 mA output (e.g. PV)
2. Overrange: Analog output value with display in overrange condition
3. Underrange: Analog output value with display in underrange condition
4. Break: Analog output value when loop break is detected
5. Max: Maximum analog output value allowed regardless of input
6. Min: Minimum analog output value allowed regardless of input
7. Calibrate: Calibrate the internal 4-20 mA source reference used to scale the 4-20 mA output

Analog Output Source

The source for generating the 4-20 mA output may be assigned to the rate/process variable, total, grand total, maximum or minimum value reached by the rate/process, or one of the set points, or the Modbus PV input.



Analog Output Calibration

To perform the analog output calibration it's recommended to use a milliamp meter with a resolution of at least 0.1 μA to measure the output current. The values saved internally during this procedure are used for scaling the 4-20 mA output in the *Setup* menu.

YPP6210 Only: Internal Source Calibration ($i\text{RL}$)

Note: The YPP6210 is factory calibrated prior to shipment to read in milliamps and volts depending on the input selection. The calibration equipment is certified to NIST standards.

The internal source allows the user to scale the controller without applying a signal.

The use of calibrated signal sources is necessary to perform the internal source calibration of the controller.

Check calibration of the controller at least every 12 months. Each input must be recalibrated separately.

Notes:

1. If controller is in operation and it is intended to accept only one input type (e.g. 4-20 mA), recalibration of other input is not necessary.
2. Allow the controller to warm up for at least 15 minutes before performing the internal source calibration procedure.

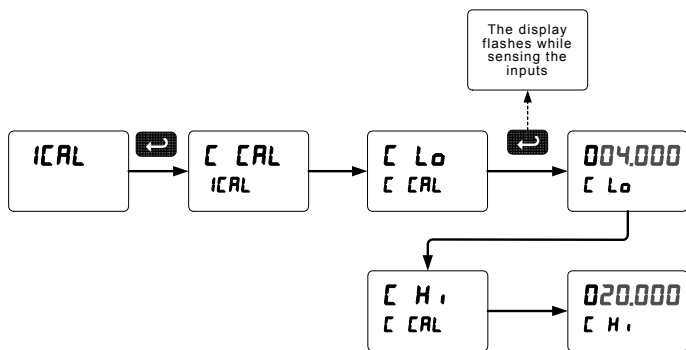
The *Internal calibration* menu is part of the *Advanced Features* menu.

1. Press and hold the Menu button for three seconds to access the advanced features of the controller.
2. Press the Up arrow button to scroll to the *Internal calibration* menu ($i\text{RL}$) and press Enter.
3. The controller displays either current calibration ($\text{C } \text{RL}$) or voltage calibration ($\text{V } \text{RL}$), according to the input setup. Press Enter to start the calibration process.

Example of Internal Calibration for current input:

4. The controller displays *low* input current message ($\text{C } \text{Lo}$). Apply the low input signal and press Enter. The display flashes for a moment while the controller is accepting the low input signal.
5. After the display stops flashing, a number is displayed with the leftmost digit brighter than the rest. The bright digit is the active digit that can be changed by pressing the Up arrow button. Press the Right arrow button to move to the next digit.

- Set the display value to correspond to the input signal being calibrated, typically 4.000 mA.
- The display moves to the *high* input calibration (C H₁). Apply the high input signal and press Enter.
- Set the display for the high input calibration, in the same way as it was set for the low input calibration, typically 20.000 mA.



The graphic above shows the calibration of the current input. The voltage input is calibrated in a similar way.

Tips:

- Low and high input signals can be any valid value within the range of the controller.
- Observe minimum input span requirements between input 1 and input 2.
- Low input should be less than high input signal.

Error Message (Error)

An error message indicates that the calibration or scaling process was not successful.

After the error message is displayed, the controller reverts to input 2 during calibration or scaling and to input 1 during internal calibration, allowing the appropriate input signal to be applied or programmed.

The error message might be caused by any of the following conditions:

1. Input signal is not connected to the proper terminals, or it is connected backwards.
2. Wrong signal selection in *Setup* menu.
3. Minimum input span requirements not maintained.

Minimum Input Span

The minimum input span is the minimum difference between input 1 and 2 signals required to complete the calibration or scaling of the controller.

Input range	Input 1 & input 2 span
4-20 mA	0.15 mA
± 10 VDC	0.10 VDC

Controller Copy Function (COPY)

The Copy function is used to copy (or clone) all the settings from one controller to other controllers requiring exactly the same setup and programming (i.e. type of input, scaling, decimal point, filter, bypass, etc.).



Warning!

Only the YPPA1200 meter copy cable must be used for meter-to-meter interfacing. The YPPA1200 is a special eight-conductor flat cable with two wires swapped.

Using standard CAT5 or other cable will cause damage to both controllers.

YPPA1200 Controller Copy Cable



Figure 22: Controller Copy Connection

Copy Function Requirements

To successfully copy settings from one controller to another, both controllers must have:

1. Same software version
2. Same baud rate setting

See *Determining Software Version*, page 86 for instructions.

Controller Copy or Cloning Instructions



Caution!

Do not connect the two controllers to the same signal source while cloning. Internal calibration may be affected.

1. Connect two controllers using an YPPA1200 controller copy cable.

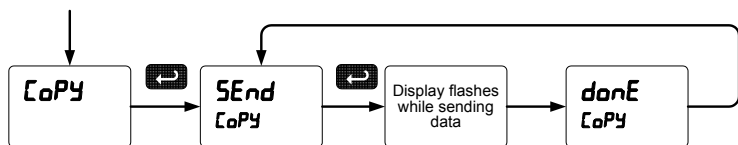


Warning!

Use YPPA1200 controller cable only!

Using standard CAT5 or other cable will cause damage to both controllers.

2. Do not connect the two controllers to the same signal source.
3. Power up both controllers. Leave clone controller in Run Mode.
4. Enter the *Advanced Features* menu of the Master controller see ADVANCED OPERATION AND PROGRAMMING page 69.
5. Scroll to the *Copy* function using the Up arrow button then press Enter.
6. The controller displays the message *SEnd*. Press Enter, the display flashes while sending data. The message *donE* is displayed when copying is completed.



7. The Clone controller displays the message *CoPy rE* while being programmed then the message *donE* when copying is completed. The controller initializes and returns to Run Mode using the same settings as the Master.
8. If controller to be cloned does not respond to the data being sent, refer to **Copy Function Requirements** above.

TROUBLESHOOTING

The rugged design and the user-friendly interface of the controller should make it unusual for the installer or operator to refer to this section of the manual. However, due to the many features and functions of the controller, it's possible that the setup of the controller does not agree with what an operator expects to see.

If the controller is not working as expected, refer to the *Diagnostics* menu and recommendations below.

***Diagnostics* Menu (d ,RL)**

The *Diagnostics* menu is located in the *Advanced Features* menu, to access *Diagnostics* menu see **ADVANCED OPERATION AND PROGRAMMING**, page 69.

It provides an easy way to view the programmed parameter settings for troubleshooting purposes. Press the Enter button to view the settings and the Menu button to exit at any time.

For a description of the diagnostic messages, see *Advanced Features Menu & Display Messages*, page 70.

Determining Software Version

To determine the software version of a controller:

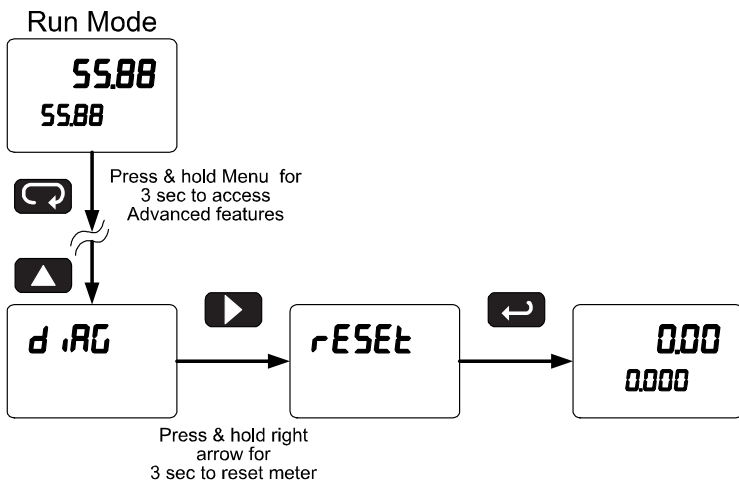
1. Go to the *Diagnostics* menu (d ,RL) and press Enter button.
2. Press Up arrow button and scroll to Information menu (In-Fa).
3. Press Enter to access the software number (5Ft) and version (vEr) information. Write down the information as it is displayed. Continue pressing Enter until all the information is displayed.
4. The controller returns to Run Mode after displaying all the settings.

Reset Controller to Factory Defaults

When the parameters have been changed in a way that is difficult to determine what's happening, it might be better to start the setup process from the factory defaults.

Instructions to load factory defaults:

1. Enter the *Advanced Features* menu. See *ADVANCED OPERATION AND PROGRAMMING*, page 69.
2. Press Up arrow to go to *Diagnostics* menu
3. Press and hold Right arrow for five seconds, press Enter when display flashes *rESEt*.
Note: If Enter is not pressed within three seconds, the display returns to the *Diagnostics* menu.
4. The controller goes through an initialization sequence (similar as on power-up), and loads the factory default settings.



Factory Defaults & User Settings

The following table shows the factory setting for the major programmable parameters on the controller. Next to the factory setting, the user may record the new setting for the particular application.

Model: _____ S/N: _____ Date: _____

Parameter	Display	Default Setting	User Setting
Input type	<i>inPut</i>	YPP6210: 4-20 mA YPP6310: Pulse	
Total	<i>YES</i>	Total enabled	
Rate Decimal point	<i>dddddd</i>	3 Places	
Total Decimal point	<i>dddddd</i>	1 Place	
G. Total Decimal point	<i>dddddd</i>	0 Places	
K-factor	<i>FACTOR</i>	1.000; YPP6310 Only	
Function	<i>FUNCTION</i>	Linear	
Number of points	<i>no Pts</i>	2	
Programming	<i>PROG</i>	Scale	
Input 1	<i>inP 1</i>	YPP6210: 4.000 mA YPP6310: 00000.0	
Display 1	<i>d ,5 1</i>	YPP6210: 4.000 YPP6310: 00000.0	
Input 2	<i>inP 2</i>	YPP6210: 20.000 mA YPP6310: 10000.0	
Display 2	<i>d ,5 2</i>	YPP6210: 20.000 YPP6310: 10000.0	
Display assignment	<i>dSPRAY</i>		
Big display (Main)	<i>b ,0</i>	Display total	
Little display (Small)	<i>L tEtLE</i>	Display rate and units	
Display intensity	<i>d- InEtY</i>	8	
Total time base	<i>t Eb</i>	Second	
Total conversion factor	<i>t CF</i>	1.000	
Batch mode	<i>no adE</i>	Manual	

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Parameter	Display	Default Setting	User Setting
Grand total time base	GT T _b	Second	
Grand total conversion factor	T CF	1.000	
Grand total reset	T rST	Manual	
Relay 1 assignment	RS U _{n1}	Total	
Relay 2 assignment	RS U _{n2}	Total	
Relay 2 preclose	PrECL5	No	
Relay 3 assignment	RS U _{n3}	Rate	
Relay 4 assignment	RS U _{n4}	Rate	
Relay 1 action	RcT 1	Automatic	
Batch preset	PrESEt	100.0	
Relay 2 action	RcT 2	Automatic	
Relay 2 set point	SEt 2	200.0	
Relay 3 action	RcT 3	Automatic	
Relay 3 set point	SEt 3	3.000	
Relay 3 reset point	rST 3	2.500	
Relay 4 action	RcT 4	Automatic	
Relay 4 set point	SEt 4	4.000	
Relay 4 reset point	rST 4	3.500	
Fail-safe relay 1	FLS 1	Off	
Fail-safe relay 2	FLS 2	Off	
Fail-safe relay 3	FLS 3	Off	
Fail-safe relay 4	FLS 4	Off	
On delay relay 1	On 1	0.0 sec	

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Parameter	Display	Default Setting	User Setting
Off delay relay 1	<i>OFF 1</i>	0.0 sec	
On delay relay 2	<i>On 2</i>	0.0 sec	
Off delay relay 2	<i>OFF 2</i>	0.0 sec	
On delay relay 3	<i>On 3</i>	0.0 sec	
Off delay relay 3	<i>OFF 3</i>	0.0 sec	
On delay relay 4	<i>On 4</i>	0.0 sec	
Off delay relay 4	<i>OFF 4</i>	0.0 sec	
Loop break relay 1	<i>Ignore</i>	Ignore, YPP6210 Only	
Loop break relay 2	<i>Ignore</i>	Ignore, YPP6210 Only	
Loop break relay 3	<i>Ignore</i>	Ignore, YPP6210 Only	
Loop break relay 4	<i>Ignore</i>	Ignore, YPP6210 Only	
Display 1 analog out	<i>d 15 1</i>	4.000	
Output 1 value	<i>Out 1</i>	4.000 mA	
Display 2 analog out	<i>d 15 2</i>	20.000	
Output 2 value	<i>Out 2</i>	20.000 mA	
Source analog output	<i>Source</i>	Rate/process	
Overrange output	<i>OverRnG</i>	21.000 mA	
Underrange output	<i>u-rRnG</i>	3.000 mA	
Loop break output	<i>brERR</i>	1.000 mA	
Filter	<i>F ILtEr</i>	YPP6210: 70 YPP6310: Hi Spd	
Bypass	<i>bYPASS</i>	0.2, YPP6210 Only	
Cutoff value	<i>CuTcOFF</i>	0.000 (disabled)	
Maximum output	<i>m RnG</i>	23.000 mA	

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Parameter	Display	Default Setting	User Setting
Minimum output	<i>min</i>	0.000 mA	
Slave ID (Address)	<i>SLAVE id</i>	247	
Baud rate	<i>bAud</i>	9600	
Transmit delay	<i>tr dLY</i>	10 ms	
Parity	<i>PAR itY</i>	Even	
Byte-to-byte timeout	<i>t-bytE</i>	010 (0.1 sec)	
F1 function key	<i>F 1</i>	Reset max & min	
F2 function key	<i>F 2</i>	Big display: Max (Hi)	
F3 function key	<i>F 3</i>	Acknowledge relays	
Digital input 1	<i>d i 1</i>	Menu	
Digital input 2	<i>d i 2</i>	Right arrow	
Digital input 3	<i>d i 3</i>	Up arrow	
Digital input 4	<i>d i 4</i>	Enter	
Digital output 1	<i>dO 1</i>	Alarm 1	
Digital output 2	<i>dO 2</i>	Alarm 2	
Digital output 3	<i>dO 3</i>	Alarm 3	
Digital output 4	<i>dO 4</i>	Alarm 4	
Password 1	<i>PASS 1</i>	000000 (unlocked)	
Password 2	<i>PASS 2</i>	000000 (unlocked)	
Password 3	<i>PASS 3</i>	000000 (unlocked)	
Total password	<i>tOtAL</i>	000000 (unlocked)	
Grand total password	<i>GTotAL</i>	000000 (unlocked)	

Troubleshooting Tips

Symptom	Check/Action
No display at all	Check power at power connector
Not able to change setup or programming, <i>Lacd</i> is displayed	Controller is password-protected, enter correct six-digit password to unlock
Controller displays error message during calibration (<i>Error</i>)	Check: <ol style="list-style-type: none"> Signal connections Input selected in <i>Setup</i> menu Minimum input span requirements
Controller displays 999999 -999999	Check: <ol style="list-style-type: none"> Input selected in <i>Setup</i> menu Corresponding signal at Signal connector
Display is unstable	Check: <ol style="list-style-type: none"> Input signal stability and value Display scaling vs. input signal Filter and bypass values (increase)
Display response is too slow	Check filter and bypass values
Display reading is not accurate	<ol style="list-style-type: none"> Signal input conditioning selected: Linear, square root, etc. Scaling or calibration
Display does not respond to input changes, reading a fixed number	Check: Display assignment, it might be displaying max, min, or set point.
Display alternates between <ol style="list-style-type: none"> <i>H i</i> and a number <i>L o</i> and a number 	Press Menu to exit max/min display readings.
Relay operation is reversed	Check: <ol style="list-style-type: none"> Fail-safe in <i>Setup</i> menu Wiring of relay contacts
Relay and status LED do not respond to signal	Check: <ol style="list-style-type: none"> Relay action in <i>Setup</i> menu Set and reset points
Flashing relay status LEDs	Relays in manual control mode or relay interlock switches opened.
Controller not communicating with application programs	Check: <ol style="list-style-type: none"> Serial adapter and cable Serial settings Controller address and baud rate
If the display locks up or the controller does not respond at all	Cycle the power to reboot the microprocessor.
Other symptoms not described above	Call Technical Support for assistance.

Alphabetical List of Display Functions & Messages

Display	Parameter	Action/Setting Description
20 mA R	20 mA output	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
4 mA R	4 mA output	Enter mA output value read by milliamp meter with at least 0.001 mA resolution
999999 -999999	Flashing display	Overrange condition Underrange condition
RAH	Acknowledge	Acknowledge relays
RA1 I	Action 1	Set relay 1 action
RA1 R I	Alarm 1	Assign digital output to Alarm 1 – 8
RA1 ERN	Alternate	Set relay for pump alternation control (relays assigned to rate)
RA1 RMN	Auto-manual	Set relay for automatic & manual reset any time
RAout	Analog output	Analog output scaling
RAout Pr	Analog output programming	Analog output programming
RA5 I	Assign 1	Relay 1 assignment
RA5 I	Assignment	Assign relays to rate, total, or grand total
RAuto	Automatic	For automatic reset
RAud	Baud rate	Select baud rate
RA	Big display	Press Enter to assign the Main display parameter (default: PV or rate)
RA H I	Max on big display	Assign digital input to display max on the main display
RA HL	Max/min big display	Assign digital input to toggle max/min on the main display
RA Lo	Min on big display	Assign the digital input to display min on the main display
RA RBH	Loop break	Set relay condition if loop break detected (For mA input only)
RA PRSS	Bypass	Set filter bypass value

Display	Parameter	Action/Setting Description
[CLR	<i>Current calibration</i>	Calibrating 4-20 mA current input (internal reference source used for scaling the input)
[H i	<i>Current high</i>	Calibrate high current input (e.g. 20 mA)
[L o	<i>Current low</i>	Calibrate low current input (e.g. 4 mA)
[tArE	<i>Capture tare</i>	Capture tare
[RL	<i>Calibrate</i>	Enter the <i>Calibrate</i> menu
[RL ob	<i>Calibrate</i>	Calibrate 4-20 mA output (internal reference source used for scaling the output)
[ontrL	<i>Control</i>	Enter <i>Control</i> menu
[oPY	<i>Copy</i>	Enter copy function
[utoff	<i>Cutoff</i>	Cutoff value
d H i	<i>Display high</i>	Select to display the max
d HL	<i>Display H&L</i>	Select to display the max & min toggling
d HoLd	<i>Display hold</i>	Display hold
d L o	<i>Display low</i>	Select to display the min
d oFF	<i>Display off</i>	Select to not turn off display
d rAtE	<i>Display rate</i>	Select to display rate
d tot	<i>Display total</i>	Select to display batch total
d Gtot	<i>Display grand total</i>	Select to display grand total
d G-t	<i>Display g-t</i>	Select to display grand total and batch total
d r-t	<i>Display r-t</i>	Select to display rate and batch total
d r-u	<i>Display r-u</i>	Select to display rate and units
d un it	<i>Display units</i>	Select to display engineering units or label
dCount		
dEc Pt	<i>Decimal point</i>	Set decimal point for rate, total, grand total
dELAY	<i>Delay</i>	Enter relay <i>Time Delay</i> menu
d I 1	<i>Digital input 1</i>	Assign digital input 1-8, if expansion modules are connected

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
d iRĒ	<i>Diagnostics</i>	Display parameter settings
d- ĩntŁ	<i>Display intensity</i>	Set display intensity level from 1 to 8
d ĩ5 1	<i>Display 1</i>	Program display 1 value
d ĩ5 2	<i>Display 2</i>	Program display 2 value
d ĩ5RbL		Disable function key
dŁY 1	<i>Delay 1</i>	Enter relay 1 time delay setup
dĒ 1	<i>Digital output 1</i>	Assign digital output 1 – 8, if expansion modules are connected
donĒ	<i>Done</i>	Copy function completed
d5ĒĒ 1	<i>Display set 1</i>	Select to display set point 1 (1-8)
d5PLRY	<i>Display</i>	Enter the <i>Display</i> menu
ĒntĒr	<i>Enter Button</i>	Assign digital input to Enter button
Ērror	<i>Error</i>	Error, calibration not successful, check signal or programmed value
F Ēn 1	<i>Force On 1</i>	Force relay 1 on using digital input (1-4)
F 1	<i>F1 function key</i>	Assign F1 function key
F2	<i>F2 function key</i>	Assign F2 function key
F3	<i>F3 function key</i>	Assign F3 function key
FRĒĒor	<i>K-factor Scaling</i>	Programs unit to convert input pulse to rate in engineering units
FR ĩLSF	<i>Fail-safe</i>	Enter <i>Fail-safe</i> menu
F ĩĒĒr	<i>Filter</i>	Set noise filter value
FL5 1	<i>Fail-safe 1</i>	Set relay 1 fail-safe operation
ForĒĒ	<i>Force</i>	Force analog output value for loop break
FuncĒn	<i>Function</i>	Select linear, square root, or programmable exponent signal input conditioning
Ē ĒĒRL	<i>Grand total</i>	Assign relay to grand total
ĒĒ ĒF	<i>Grand total conversion factor</i>	Program grand total conversion factor

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
Gr r St	<i>Grand total reset</i>	Program grand total reset mode: auto or manual
Gr t b	<i>Grand total time base</i>	Program grand total time base
Gr o t R L	<i>Grand total password</i>	Set or enter password for manual reset
i C R L	<i>Internal source calibration</i>	Enter internal source calibration (used for scaling the controller without a signal source)
I G n o r E	<i>Ignore</i>	Ignore loop break condition
I n F o	<i>Information</i>	Display software and S/N information
I n P 1	<i>Input 1</i>	Calibrate input 1 signal or program input 1 value
I n P 2	<i>Input 2</i>	Calibrate input 2 signal or program input 2 value (up to 32 points)
I n P u t	<i>Input</i>	Input selection
L R L C H	<i>Latching</i>	Set relay for latching operation (relays assigned to rate)
L E D t	<i>LED test</i>	Test all LEDs
L i n E A r	<i>Linear</i>	Set controller for linear function and select number of linearization points
L i t H i	<i>Max on little display</i>	Assign digital input to display max on the small display
L i t H L	<i>Max/min little display</i>	Assign the digital input to toggle max/min on the small display
L i t L o	<i>Min on little display</i>	Assign digital input to display min on the small display
L i t t L E	<i>Little display</i>	To assign the small display parameters
L o c k	<i>Locked</i>	Enter password to unlock controller
L t - C L r	<i>Latching-cleared</i>	Set relay for latching operation with manual reset only after alarm condition has cleared (relays assigned to rate)
m A	<i>4-20 mA</i>	Set controller for 4-20 mA input
m A n	<i>Manual</i>	To manually control

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
Ⓜ RH	Maximum	Program maximum mA output allowed
Ⓜ bUS	Modbus	Select to display Modbus input or to assign Modbus input as the analog output source
Ⓜ ENU	Menu button	Assign digital input to Menu button
Ⓜ m	Minimum	Program minimum mA output allowed
Ⓜ PLS	Number of points	Set controller for 2 to 32-point linearization
Ⓜ nonrSt	Non-resettable	Non-resettable grand total set after entering "050873" for Gtotal password
Ⓜ Hold	Relays output hold	Assign digital input to hold all relays state
OFF	Off	Disable relay and front panel status LED, turn relays off, program off time delay
OFF 1	Off	Set relay 1 Off time delay
On	On	Enable fail-safe operation, turn relays on, program on time delay
On 1	On	Set relay 1 On time delay
Ⓜ-r RnG	Overrange	Program mA output for display overrange
Ⓜut 1	Output 1	Program output 1 value (e.g. 4.000 mA)
Ⓜut 2	Output 2	Program output 2 value (e.g. 20.000 mA)
PRSS	Password	Enter the Password menu
PRSS 1	Password 1	Set or enter Password 1
PRSS 2	Password 2	Set or enter Password 2
PRSS 3	Password 3	Set or enter Password 3
PrELLS	Preclose	The amount before the preset is reached that multi-stage relays will deactivate.
PrESEt	Preset	Batch control preset
Pr oG	Program	Enter the Program menu
Pr oG E	Programmable exponent	Set controller for programmable exponent and enter exponent value
rRtE	Rate	Assign relay to rate

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
<i>rELAY</i>	<i>Relay</i>	Enter the <i>Relay</i> menu
<i>rESEt</i>	<i>Reset</i>	To access the <i>Reset</i> menu
<i>r iGht</i>	<i>Right arrow</i>	Assign digital input to Right arrow button/F1
<i>rLY 1</i>	<i>Relay 1</i>	Relay 1 setup
<i>rLY 2</i>	<i>Relay 2</i>	Relays 2-8 setup <i>Note: Relays 5-8 are shown, only if expansion relay module is installed.</i>
<i>rLY d</i>	<i>Disable relay</i>	Assign digital input to disable all relays
<i>rLY E</i>	<i>Enable relay</i>	Assign digital input to enable all relays
<i>rSt 1</i>	<i>Reset 1</i>	Program reset point 1
<i>rSt bc</i>	<i>Reset batch count</i>	To reset the batch count
<i>rSt Gt</i>	<i>Reset grand total</i>	To reset grand total
<i>rSt H i</i>	<i>Reset high</i>	Press Enter to reset max display
<i>rSt HL</i>	<i>Reset high & low</i>	Press Enter to reset max & min displays
<i>rSt Lo</i>	<i>Reset low</i>	Press Enter to reset min display
<i>rSt t</i>	<i>Reset Total</i>	Reset total
<i>SAmPL</i>	<i>Sampling</i>	Set relay for sampling operation
<i>SCALE</i>	<i>Scale</i>	Enter the <i>Scale</i> menu
<i>SELEct</i>	<i>Select</i>	Enter the <i>Select</i> menu (function, cutoff, out)
<i>SEnd</i>	<i>Send</i>	Send controller settings to another controller
<i>SEr iAL</i>	<i>Serial</i>	Set serial communication parameters
<i>SEt 1</i>	<i>Set 1</i>	Program set point 1
<i>SEtUP</i>	<i>Setup</i>	Enter <i>Setup</i> menu
<i>SLAVE id</i>	<i>Slave ID</i>	Set Slave ID or controller address
<i>Source</i>	<i>Source</i>	Select source for the 4-20 mA output
<i>SqURrE</i>	<i>Square root</i>	Set controller for square root extraction

Model YPP6210 & YPP6310 Batch Controllers Instruction Manual

Display	Parameter	Action/Setting Description
Sr t	<i>Start</i>	Begin batch
St oP	<i>Stop</i>	Pause/Stop batch
tRr ESt	<i>Reset tare</i>	Reset tare
t CF	<i>Total conversion factor</i>	Program total conversion factor
t dLY	<i>Time delay</i>	Program time delay for total auto reset
t rSt	<i>Total reset</i>	Program total reset mode: auto or manual
t tb	<i>Total time base</i>	Program total time base
t o tRL	<i>Total</i>	Enable or disable totalizer features
t r dLY	<i>Transmit delay</i>	Set transmit delay for serial communication
unLoC	<i>Unlocked</i>	Program password to lock controller
uP	<i>Up arrow button</i>	To assign digital input to up arrow button
u-r RnG	<i>Underrange</i>	Program mA output for display underrange
uSEr	<i>User I/O</i>	Assign function keys and digital I/O
U CAL	<i>Voltage calibration</i>	Calibrating voltage input
U Hi	<i>Voltage high</i>	Calibrate high voltage input (e.g. 10 V)
U Lo	<i>Voltage low</i>	Calibrate low voltage input (e.g. 0 V)
UoLt	<i>0-10 VDC</i>	Set controller for ±10 VDC input

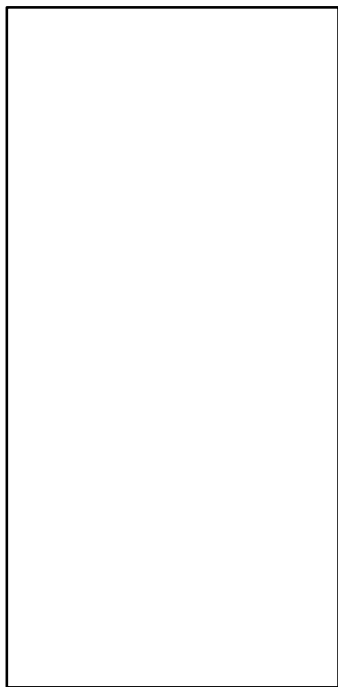


Figure 23: 1/8 DIN Panel Cutout Template

How to Contact Yokogawa Corporation of America

- For Sales and Technical Support please
Call: (800) 888-6400 or (770) 254-0400
Fax: (770) 251-2088
Email: meters-instr@us.yokogawa.com
- For the latest version of this manual please visit
www.yokogawa-usa.com