

Controllers

FIELDPAC™ 348 Field-Mounted Controller

Introduction

Features & Benefits

- ▶ The need for only one wire pair to communicate with the control room reduces wiring costs
- ▶ Combines multiple loop components in a single package for reduced hardware and maintenance costs
- ▶ Improves loop accuracy by using digital technology and by eliminating data communication errors among multiple components.
- ▶ The ability to communicate with the controller from a remote, central location improves operations
- ▶ Implementation of the HART® communication protocol facilitates use with many control system devices
- ▶ Factory Configured Options (FCOs) reduce configuration time for standard control strategies
- ▶ Flexible input options accommodate existing I/O

Description

The FIELDPAC 348 Field-Mounted Controller supports an advanced single-loop control applications, while reducing installed costs. The FIELDPAC controller lowers hardware costs by providing multiple loop components in one package and decreases wiring costs by reducing to one the number of wire pairs needed to transmit data to a central control room.

The loop components integrated within the FIELDPAC controller are based on the proven technology of several other instruments, including the Siemens Controllers, pressure transmitters, and I/P and P/I converters. This combination allows the FIELDPAC controller to provide an innovative, reliable controller that can be mounted directly at the process site.

The FIELDPAC controller includes a TYPE 4X (IP65) enclosure and a hazardous area design (intrinsically safe and non-incendive) to allow installation at the process site. It offers several choices of direct process inputs, optional pneumatic or thermocouple/RTD inputs, and an optional pneumatic output, all of which are in addition to the standard complement of 4-20 mA inputs and discrete I/O.

The FIELDPAC controller also minimizes wiring costs via the HART protocol. With HART digital signal, the FIELDPAC controller transmits process data to a control room over one standard wire pair, instead of the three to four wire pairs required by a typical loop. Using HART also allows the FIELDPAC controller to communicate with many other devices, because HART has the largest base of any field communications protocol.

The FIELDPAC controller accommodates control strategies ranging from basic PID control to sophisticated loops, such as



ratio, bias, single-station cascade, dual-loop and feed-forward control. Circuits are configured via the same function block technique employed with the Model 353 Process Automation Controller, where the user simply selects the desired blocks, connects them, and sets parameters, such as gains and timer values. Moreover, the FIELDPAC controller provides over 60 pre-configured function blocks containing more than 200 functions.

In addition, the FIELDPAC controller provides many pre-configured control strategies (FCOs). Each FCO can be used as is, or customized as needed, significantly reducing configuration time for standard control requirements.

The FIELDPAC controller is configured locally or at a remote PC. The station's pushbuttons allow the FIELDPAC controller to be configured at the faceplate.

Specifications

Electrical

DC Power Supply (348_D)

Input: $V_{PS} = 14.0\text{-}28.0$ Vdc
Power: Consumption: 4.4 Watts (max.)

AC Power Supply (348EA_)

Input: 90-264 Vac, 47 to 63 Hz
Voltage Selection: Auto-sensing
Power Consumption: 32 VA

2-Wire Transmitter Power (348E_)

Voltage: DC-Powered: 4.5 V less than V_{PS}
AC-Powered: 22 Vdc (nominal)
Current: 80 mA (max.), short circuit protected

Heat Dissipation

DC-Powered: 3.5 BTU/hr.
AC-Powered: 4.6 BTU/hr.

Mounting

Type: Panel, 2" Pipe, or Wall
Panel Cutout: 11.5" H x 10.0" W, ± 0.1
292 mm H x 254 mm W, ± 2.5 mm

Environmental

Hazardous Area Classification

348S: Intrinsically Safe
CSA Class I; Division 1; Groups C, D
CSA Class II; Division 1; Groups E, F, G
CSA Class III; Division 1
348E: FM/CSA Class I; Division 2; Groups A, B, C & D
CE Compliant

Ambient Temperature Range

-40 to 85°C (-40 to 185°F)

Humidity

0 to 100%

ESD Susceptibility

15,000 volts discharged to case and keyboard
5,000 volts to any terminal connection

Surge Protection

ANSI/IEEE C37.90, 1.5 kV

Inputs

Analog Inputs

Standard Calibration: 1 to 5 Vdc
Zero: 0 to 1 Vdc
Span: 4 to 5 Vdc
Input Impedance: > 1 megohm
Type: Single-ended (non-isolated)
Normal Mode Rejection: -64 dB @ 60 Hz
Maximum Continuous Input: ± 30 Vdc
Accuracy: < ± 0.85 % per 50°C

Digital Inputs

Logic "1" (ON): 12 to 30 Vdc
Logic "0" (OFF): 0 to 5 Vdc
Type: Opto-coupled (isolated)
Input Impedance: 3300 ohms

Pneumatic Inputs (Optional)

15 PSIG (103 kPa) Sensor:
Standard Calibration: 3 to 15 psig (20.7 kPa to 103 kPa)
Zero: 0 to 4 psig (0 to 27.6 kPa)
Span: 12 to 15 psig (82.7 kPa to 103 kPa)
30 PSIG (207 kPa) Sensor:
Zero: 0 to 8 psig (0 to 55.1 kPa)
Span: 24 to 30 Psig (165 kPa to 207 kPa)
Accuracy: ± 0.35 % of span
Temperature Effect: < 0.06% per °C

Input Types

Thermocouple: R, S, T, B, J, K, E, N
RTD: DIN:a = 0.003850W/°C
US: a = 0.003920W/°C (100, 200 & 500 W available)

mV Wide: Zero: -15 to 100 mVdc
Span: 5 to 115 mVdc

mV Narrow: Zero: -10 to 25 mVdc
Span: 1 to 35 mVdc
Input Impedance: > 1 megohm

Direct Process Pressure (Optional)

Types: Gauge, Differential, Absolute
See information on direct process pressure input, page 2.21

Outputs

Analog Outputs

Standard Calibration: 4 to 20 mA
Accuracy: < ± 0.1 % of span
Load: DC Power: < $[(V-6.83)/21.6]$ W
AC Power: < 680W
Signal Reference: Negative terminal is controller common
Temperature Effect: ± 0.5 % per 50°C

Discrete Outputs

Type: Open collector transistor (emitter tied to controller common)
Load Voltage: 30 Vdc (max.)
Load Current: 100 mA (max.)
"ON" Voltage: 0.9V @ 100 mA
"OFF" Leakage: 0.5 uA @ 30 Vdc

Isolated Discrete Outputs

Type: Opto Transistor
Load Voltage: 30 Vdc (max.)
Load Current: 50 mA (max.)
"ON" Voltage: 5.0 V @ 20 mA; 0.5 V @ 2 mA
"OFF" Leakage: 2.0 mA @ 30 Vdc

Relay Outputs

Type: Epoxy sealed
Switch: SPDT (Form C)
Rating: 3A @ 250 Vac

Pulse Integrator Output

Type: Open collector transistor (emitter tied to common)
Load Voltage: 30 Vdc (max.)
Load Current: 100 mA (max.)
"ON" Voltage: 0.9 V @ 100 mA
"OFF" Leakage: 0.5 uA @ 30 Vdc

Controllers

FIELDPAC™ 348 Field-Mounted Controller

Technical data

Function Blocks

Control strategies within the FIELDPAC controller are designed using the following function blocks, which are stored in memory. The blocks are used by assigning an execution sequence number to each block.

Type	Description	Qty., 348S	Qty., 348E	Std./ Opt.
Input	Analog Input (1-5 Vdc)	3	3	S
Input	Discrete Input	2	2	S
Input	Pneumatic Input	1/3 ¹	1/3 ¹	O
Input	Process Pressure Input	1	1	O
Input	Thermocouple/RTD/mV Input	1	1	O
Output	Analog Output (4-20 mAdc)	2 ²	2 ²	S
Output	Discrete Output	2	2	S
Output	Isolated Discrete Output	2	0	S
Output	Isolated Relay Output	0	2	S
Output	Pulse Integrator Output	1	1	S
Output	Pneumatic Output (3-15/3-27 PSI)	1 ²	1 ²	O
Control	Ratio	1	1	S
Control	Bias	1	1	S
Control	HI/LO Setpoint Limit	2	2	S
Control	Override Selector	1	1	S
Control	Pushbutton Transfer Switch	2	2	S
Control	Process Alarms	2	2	S
Control	Controller (PID, ID, PD, PIDAG)	2	2	S
Control	Auto/Manual Transfer	2	2	S
Control	Integrator/Totalizer	1	1	S
Control	Setpoint Track & Hold	2	2	S
Control	General-Purpose Track & Hold	1	1	S
Control	General-Purpose Hold	1	1	S
Control	Logic (AND, NAND, OR, NOR, XOR)	9	9	S
Control	Deviation Amplifier	1	1	S
Control	Square Root Extractor	1	1	S
Control	Pulse Integrator	1	1	S
Control	Math (add, subtract, multiply, divide)	3	3	S
Control	Gain & Bias	2	2	S
Control	Lag	1	1	S
Control	Lead	1	1	S
Control	Rate Limiter	1	1	S
Control	Dead Time Table	1	1	S
Control	10-Segment Characterizer	2	2	S
Control	Repeat Cycle Timer	1	1	S
Control	General-Purpose Transfer	1	1	S
Control	Batch Switch	1	1	S
Control	Quad Comparator	1	1	S
Control	Delay Timer	1	1	S
Control	One Shot Timer	1	1	S
Control	Dual Transfer Switch	1	1	S
Operation	Operator Display	1	1	S
Operation	Password Security	1	1	S
Operation	HART Interface	1	1	S

Model Number

Intrinsically Safe
Field-Mounted Controller
Non-Incendive
Field-Mounted Controller⁶

Power Supply

- 90-264 Vac, 47-63 Hz³
- 90-264 Vac, 47-63 Hz³
(CE Compliant)
- 14-28 Vdc, non-isolated

Operator's Display

- Full-Function
- Full-Function with Backlight³

Process Pressure Input

- Direct-Connected D/P Sensor⁴
- Direct-Connected Pressure Sensor⁴
(gauge & absolute)
- Removable plug for future
sensor mounting
- Not Required

Analog Option Board

- (1) 15 PSIG Pneumatic Input
- (3) 15 PSIG Pneumatic Inputs
- (1) 30 PSIG Pneumatic Input
- (3) 30 PSIG Pneumatic Inputs
- Thermocouple/RTD/Millivolt Input
- Not Required

Analog Output No.1 Options

- 4-20 mA Current
- 15 PSIG Pneumatic
- 30 PSIG Pneumatic

Design Level

- Current Design

Reserved

- No Modifications

Reserved

- Reserved

Communications

- HART

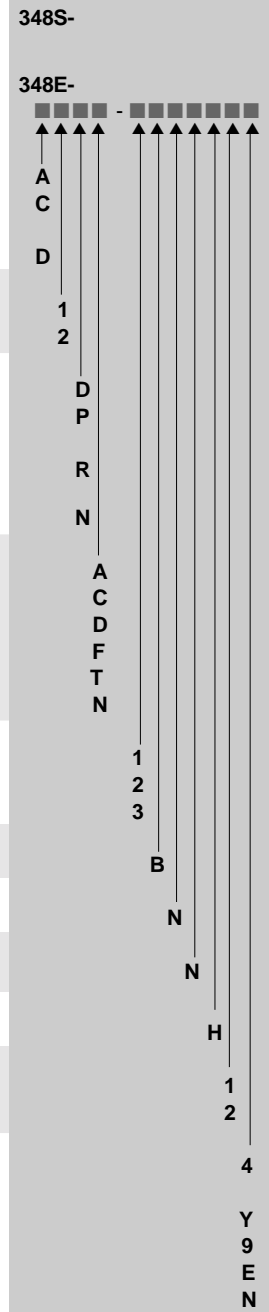
Electrical Connections

- 1/4 NPT
- 1.5 Metric

Hazardous Area Classifications⁵

- FM/CSA Class I; Div.2;
Groups A, B, C & D
- CSA Class I; Div.1; Groups C & D
- BASEEFA TypeN
- CE Compliant
- Not Required

Order No.



1) Analog input #1 is not available when the option for (1) or (3) pneumatic inputs is used, and analog input #3 is not available when the option for (3) pneumatic inputs is used.

2) Analog output #1 is used to drive the I/P output and is not available as a current output when the pneumatic output option is used.

3) Model 348E only.

4) Refer to the information on direct process pressure input on page 2.21 for the model number used to specify sensor options. For example, the differential pressure version of the "Direct Connect" output option (D) of each model number is used to indicate a FIELDPAC application.

5) Other agency approvals pending.

6) Approved intrinsic safety barriers are required for Div.1 installations.

Accessories

Standard Configurations

The most common types of control have been configured at the factory and stored in the FIELDPAC controller's memory. These control strategies, called FCOs, can be easily recalled from memory and used as is or modified to meet individual requirements. They include:

- ▶ Single-loop PID controller
- ▶ External-set PID controller
- ▶ Ratio-set PID controller
- ▶ Cascade controller
- ▶ Dual-loop controller

Accessories

- ▶ FIELDPAC Configuration Software (P/N 15939-48Vx.xx¹⁾ - PC-based software package for configuring the FIELDPAC controller (DOS-based).
- ▶ Resistor Kit (P/N 16161-111) - For use with 4-20 mA inputs (250W).
- ▶ Permanent Instrument Tag - The instrument name-plate can be stamped with up to three lines of text (at up to 30 characters per line).
- ▶ Extended Mounting Bracket (P/N 16161-88) - Provides additional room for mounting. Order 2 when wall mounting a FIELDPAC unit with direct-connected D/P sensor or when pipe-mounting a FIELDPAC unit with a three-valve manifold and a D/P sensor. Should not be used in an area with excessive vibration.
- ▶ Mounting Bracket (P/N 16161-197)
- ▶ Hart Modem (P/N 16275-235 - The Hart modem is a Bell 202T style modem for use with the PC configuration software package.
- ▶ 24 V ac/dc Barrier/Supply Kit (P/N 16161-140 Stahl 938/10-158-160-10) - This approved barrier/supply combination powers the Model 348S when installed in Div. 1, Class I, Groups C, & D; Class II, Groups E, F & G; and Class III areas. The barrier/supply converts its nominal 24 Vac/dc input into an approved, barrier protected 15 Vdc power source for the Model 348S.
- ▶ 120/240 Vac Barrier/Supply Kit (P/N 16161-141 Stahl 938/10-158-160-50) - This approved barrier/supply combination powers the Model 348S when installed in Div. 1, Class I, Groups C & D; Class II, Groups E, F & G; and Class III areas. The barrier/supply converts its nominal 120/240 Vac input into an approved, barrier protected 15 Vdc power source for the Model 348S.
- ▶ Hart Signal Barrier Kit (P/N 16161-142 Stahl 9001/02/-016-015-10) - This approved barrier conditions Hart signals passing to the Model 348S when installed in Div. 1, Class I, Groups C, & D; Class II; Groups E, F, & G; and Class III areas.

Model Number

Differential Pressure
Absolute Pressure
Gauge Pressure

Input Range: Span Limits Min/Max

- 0.2/5" H₂O (model 340D only)
- 0.75/15" H₂O (model 340D only)
- 10/450" H₂O
- 12.6/450 PSI
- 300/5500 PSIG (model 340G only)

Output

- Direct Connection to Model 348 Field Mounted Controller or Spare Capsule

Process Diaphragm

- Hastelloy C-276 (Standard on Ranges D, F, and G)
- 316LSS (Standard on Ranges A & B)

Body Parts

Wetted	Vent/Drain	Process Connection	
• 316SS	End	1/2 NPT (Standard on all Ranges)	AA
• 316SS	Side (top)	1/2 NPT (model 340D only)	AB
• 316SS	Side (bottom)	1/2 NPT (model 340D only)	AC
• 316SS	Side (dual)	1/2 NPT (model 340D only)	AD
• 316SS	End	1/4 NPT (model 340D only)	AE
• 316SS	Side (top)	1/4 NPT (model 340D only)	AF
• 316SS	Side (bottom)	1/4 NPT (model 340D only)	AG
• 316SS	Side (dual)	1/4 NPT (model 340D only)	AH
• Hastelloy C-276	End	1/2 NPT	BA
• Hastelloy C-276	Side (top)	1/2 NPT (model 340D only)	BB
• Hastelloy C-276	Side (bottom)	1/2 NPT (model 340D only)	BC
• Hastelloy C-276	Side (dual)	1/2 NPT (model 340D only)	BD
• Hastelloy C-276	End	1/4 NPT (model 340D only)	BE
• Hastelloy C-276	Side (top)	1/4 NPT (model 340D only)	BF
• Hastelloy C-276	Side (bottom)	1/4 NPT (model 340D only)	BG
• Hastelloy C-276	Side (dual)	1/4 NPT (model 340D only)	BH

Fill Fluid

- Silicone DC200 (Standard on All Ranges)
- Inert
- Paratherm

Output Indicator

- Not Required

Standard Options

- Oxygen Cleaned
- Bolting (model 340D only)
- Bolting (model 340D only)
- Not Required

Mounting Bracket

- Not Required

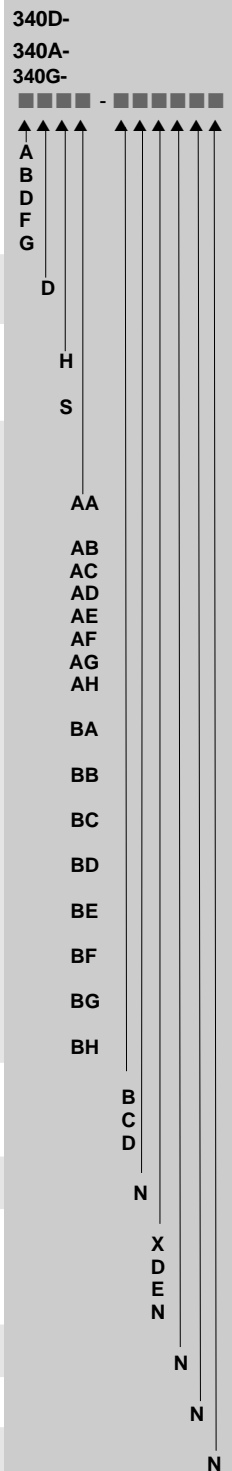
Housing

- Not Required

Hazardous Area Classifications

- Non-Approved

Order No.



1) "x.xx" specifies the software's version number. This will be defined by Siemens as the latest version number.

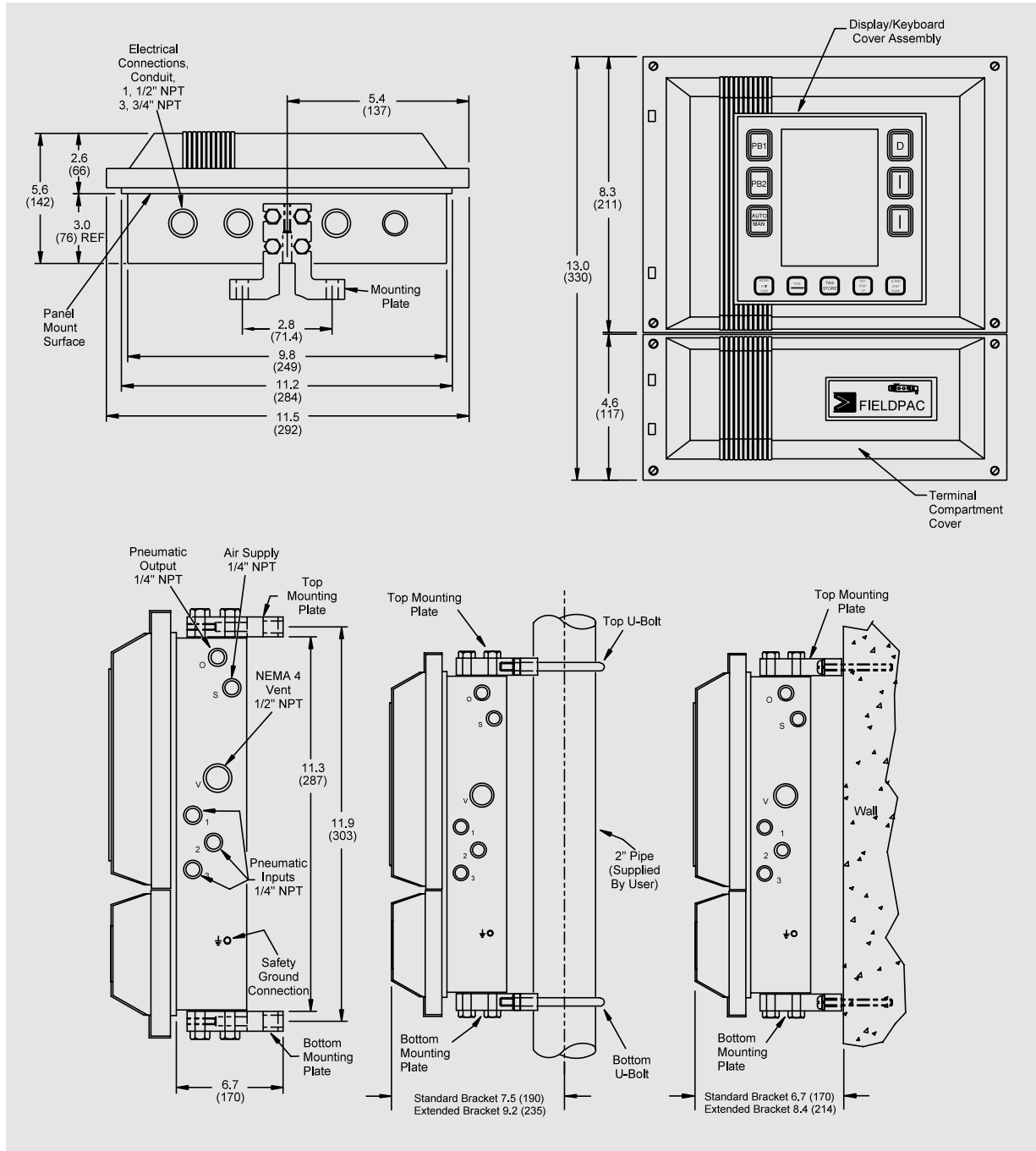
Controllers

FIELDPAC™ 348 Field-Mounted Controller

Dimensional drawings

Dimensions

2



Panel Cutout: 11.5±0.1 (292±2.5) High X 10.0±0.1 (254±2.5) Wide

Panel Thickness: 3/16" (4.76) maximum

Except for panel cutout, all dimensions are nominal and for reference only.

The FIELDPAC controller with a pressure sensor must mount on a panel or pipe.