DR-I4 Series

Isolated Signal Converter with Universal Power Supply

DR-I4E

Signal Converter for electrical signals, isolated, for industrial applications

Isolated signal converter for electrical signals. Accepts a wide range of AC and DC voltages, with ranges from 50 mV AC/DC up to 600 V AC/DC, and a wide range of AC and DC current signals, from 5 mA AC/DC up to 5 A AC/DC. The instrument can be configured to measure frequency from any of the AC voltage and AC current signals accepted. Unipolar and bipolar signals accepted for DC voltage and DC current signals.

DR-I4F

Signal Converter for Impulses and Frequency Signals, Isolated, for Industrial Applications

Isolated signal converter for frequency signals. Configurable to work with NPN, PNP, pick-up, Namur, mechanical contact, reed contact and other types of sensors. Dedicated input to measure frequency from AC voltage signals up to 600 VAC. Accepts a wide range of frequency ranges, from 1 Hz up to 1 MHz, with minimum workable signal of 100 mHz and resolution of 1 mHz.

DR-I4L

Signal Converter for load cells and millivolts, isolated, industrial applications

Isolated signal converter for load cell signals and millivolts. Provides +5 VDC excitation voltage to power the load cell, and 'sense' function to compensate for excitation voltage variations. Accepts direct connection of 1, 2, 3, or up to 4 load cells (typical 350 Ohm load cells). Accepts 4 and 6 wire load cells. Accepts unipolar and bipolar ranges up ±80 mV.

DR-I4P

Signal Converter for process and temperature signals, isolated, industrial applications

Isolated signal converter for process and temperature signals. Accepts a wide range of process signals including 4/20 mA, 0/10 V DC, potentiometers and resistance measurements, providing excitation voltage to power the transducer when needed. Accepts a wide range of temperature signals, including Pt100, Pt500, Pt1000, thermocouples J, K, N, E, T, R, S, C and B, NTC sensors from 44004 to 44008 and from 44030 to 44034, and a configurable NTC range with configurable R25 and ß parameters.

DR-I4 Series Features for all Models

Configurable output in 4/20 mA (active or passive) or 0/10 VDC. Universal power supply from 18 to 265 V AC/DC. 3 way isolation between input, output and power circuits. Circuit isolation prevents ground loops and transient propagation, protecting remote equipment and signal integrity.

Predefined configuration codes are available for fast and easy configuration. An advanced configuration menu is available to customize input and output signal ranges to specific values required. Configuration is done through the front push-button keypad. Front information displays

available for configuration and system information (input signal value, output signal value, configured label, signal percentage and process value).

Built-in 'force' functions to manually generate low and high output signals and to validate remote instrumentation during installation. 'SOS' mode to help on critical maintenance and repairs. Configurable power frequency rejection filter. 'Password' function to block non-authorized access to 'configuration menu'. Designed for industrial use, with potential integration into a wide range of applications, reduced cost, excellent quality and available customization.

DR-I4 Series: Technical Specifications

DR-I4E

INPUT SIGNAL RANGES V AC

Ranges: From 50 mV AC up to 600 VAC

Type of Measure: True RMS

Connections Accepted: Phase-to-phase
Phase-to-neutral

Category of Measure: CAT-II up to 300 VAC

INPUT SIGNAL RANGES V DC

Ranges Unipolar: From 0/50 mV DC up to 0/600 VDC

Ranges Bipolar: From ±50 mV DC up to ±600 VDC

INPUT SIGNAL RANGES A AC

Ranges: From 5 mA AC up to 5 A AC

Type of Measure: True RMS

Connections Accepted: Phase-to-neutral
Phase-to-phase

INPUT SIGNAL RANGES A DC

Ranges Unipolar: From 0/5 mA DC up to 0/5 A DC

Ranges Bipolar: From ±5 mA DC up to ±5 A DC

FREQUENCY AC

Ranges: Up to 100 Hz

Measured From: Measured from existing V AC and A AC signal ranges

ACCURACY AT 25 °C: See manual for each type of signal*

*Accuracy values are indicated for 4/20 mA output. For 0/10 VDC output, add +0.05 % to indicated accuracy values.

THERMAL DRIFT: 150 ppm/ °C

STEP RESPONSE

AC signals: <350 mSec. typ. (0 to 99%)

DC signals*: <90 mSec. typ. (0 to 99%) 'no filter'
<175 mSec. typ. (0 to 99%) '50 Hz filter' or '60 Hz filter'
<350 mSec. typ. (0 to 99%) '50 and 60 Hz filter'

DR-I4F

SENSORS

Types of Sensor: NPN, PNP, pick-up, push-pull, mechanical contact, reed contact, VAC, ...

Sensor Configuration: See the User's Guide 'Advanced sensor' menu (section 16.2)

Max. Voltage at Terminals: (see Table 2)

Input Impedance: (see Table 3)

Maximum Frequency: (see Table 2)

Excitation Voltage: 15 VDC @50 mA
8.2 VDC @50 mA
5 VDC @50 mA

Typical Detection Levels: (see Table 2) Detection levels are changeable through the 'trigger' parameter

ACCURACY AT 25°C

'Slow' Mode Error: $f^2 \times 0.5 \times 10^{-6}$ Hz.

'Fast' Mode Error: 1/gate (see User's Guide 'Gate' parameter at section 16.2) (typical error 2 Hz for 'Gate' of 0.5 seconds)

Quartz Accuracy: ±50 ppm

mA Output Accuracy: 0.05 % FS

VDC Output Accuracy: 0.10 % FS

Thermal Drift: 50 ppm/°C

Min. Detectable Frequency: 100 mHz (signals below 100 mHz are considered 0 Hz)

Resolution: 1 mHz

STEP RESPONSE

In 'Fast' Mode: 'Gate' parameter + 50 mSec.

In 'Slow' Mode: 1/frequency + 50 mSec.

DR-I4L

INPUT SIGNAL RANGES FOR LOAD CELLS

Signal Ranges: From 0/5 mV up to 0/80 mV

Bipolar Signal Ranges: From ±5 mV up to ±80 mV

Excitation Voltage: +5 VDC

Excitation voltage variations: Automatic compensation

Excitation current: Max. 70 mA

INPUT SIGNAL RANGES FOR MILLIVOLTS

Signal Ranges: From 0/5 mV up to 0/80 mV

Bipolar Signal Ranges: From ±5 mV up to ±80 mV

Excitation Voltage: No

Input Impedance: 10 MOhm typical (with 1 MOhms during 150 milliseconds, every 10 seconds approx.)

ACCURACY AT 25 °C: See manual for each type of signal*

*Accuracy values are indicated for 4/20 mA output. For 0/10 VDC output, add +0.05 % to indicated accuracy values

THERMAL DRIFT: ±150 ppm/ °C (F.S.) for ranges up to 5 mV
±100 ppm/ °C (F.S.) for ranges up to 20 mV
±75 ppm/ °C (F.S.) for ranges up to 80 mV

STEP RESPONSE

Typical response times to reach 99 % of the output signal, in response to a 100 % step at the input.

With 'no filter': <115 mSec. typ. (0 to 99%)

With '50 Hz filter' or '60 Hz filter': <150 mSec. typ. (0 to 99%)

With '50 and 60 Hz filter': <300 mSec. typ. (0 to 99%)

DR-I4P

INPUT SIGNAL RANGES

Process: 4/20 mA, 0/10 VDC (active and passive) excitation voltage +15 VDC @25 mA

Thermocouples: J, K, N, E, T, R, S, C and B conforming to ITS-90

'Pt' sensors: Pt100 (2 wires and 3 wires)
Pt500, Pt1000 (2 wires)

'NTC' Sensors: (see manual)

Resistances: Ranges from 0/1 Kohm up to 0/1 MOhm

Potentiometers: Nominal value from 250 Ohm to 15 KOhm

ACCURACY AT 25 °C: See manual for each type of signal

*Accuracy values are indicated for 4/20 mA output. For 0/10 VDC output, add +0.05 % to indicated accuracy values.

THERMAL DRIFT ±100 ppm/ °C (F.S.)
±0.05 °C/ °C (thermocouple cold junction)

STEP RESPONSE: Step response is associated to the configured power filter. Typical response values to reach 99 % of the output signal, as a response to a 100 % step at the signal input (see Table 1).

ALL MODELS

OUTPUT SIGNAL RANGES

Active Current Output: 4/20 mA active
Max. <22 mA, min. 0 mA
Maximum load <400 Ohm

Passive Current Output: 4/20 mA passive
Max. 30 VDC on terminals

Voltage Output: 0/10 VDC,
Max. <11 VDC, Min. -0.05 VDC (typ.)
Minimum load > 10 KOhm

CONFIGURATION SYSTEM

Key Pad + Display: Accessible at the front of the instrument

Configuration: 'Configuration menu' and predefined 'codes'

Scalable Units: Scalable input ranges
Scalable output ranges
Scalable process display

POWER SUPPLY

Voltage Range: 18 to 265 VAC/DC isolated (20 to 240 VAC/DC ±10 %)

AC Frequency: 45 to 65 Hz

Consumption: <3.0 W
Power Wires: 1 mm² to 2.5 mm² (AWG17 to AWG14)
Overvoltage Category: 2

ISOLATION

Input - Output: 3000 Veff (60 seconds)
Power - Input: 3000 Veff (60 seconds)
Power - Output: 3000 Veff (60 seconds)

ENVIRONMENTAL

IP Protection: IP30
Impact Protection: IK06
Operation Temperature: From 0 to +50 °C
Storage Temperature: From -20 to +70 °C
'Warm-up' Time: 15 minutes
Humidity: 0 to 95% non condensing
Altitude: Up to 2000 meters

MECHANICAL

Size: 106 x 108 x 22.5 mm
Mounting: Standard DIN rail (35 x 7.5 mm)
Connections: Plug-in screw terminal (pitch 5.08 mm)
Housing Material: Polyamide V0
Weight: <150 grams
Packaging: 120 x 115 x 30 mm, cardboard

Dimensions

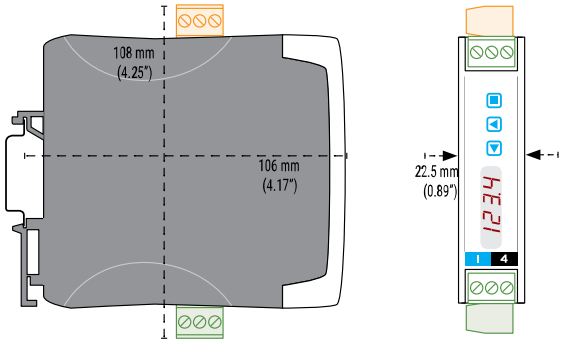

Table 1 I DR-I4P Response Times

Type of Signal	No Filter	50 Hz or 60 Hz Filter	Both
Process	<60 mSec.	<250 mSec.	<600 mSec.
Pt100	<100 mSec.	<320 mSec.	<2 Sec.
Thermocouple	<100 mSec.	<200 mSec.	<1 Sec.
Resistances*	<100 mSec.	<200 mSec.	<200 mSec.

**For a 1 MOhm range, the response time is doubled.*

Table 2 I DR-I4F Predefined Sensors and Associated Configuration

Sensor	Pull Resistors	Gain	Trigger Level	Anti-Rebound	Vexc	Reading Channel	Max. Frequency
NPN	Pull-Up	x1	25	0 mS	+15 V	B	100 KHz
PNP	Pull-Down	x1	15	0 mS	+15 V	B	100 KHz
Mechanical	Pull-Up	x1	25	100 mS	+15 V	B	500 Hz
Reed	Pull-Up	x1	25	100 mS	+15 V	B	500 Hz
Pick-Up	None	x100	15	0 mS	+15 V	A	50 KHz
Namur	Pull-Down	x1	15	0 mS	+8.2 V	B	1 MHz
TTL	None	x1	15	0 mS	+5 V	B	1 MHz
VAC	None	x1	15	0 mS	Off	A	1 KHz

Table 3 I Sensor Types and Specifications

Sensor	Zin	Max. Voltage at Terminals	Minimum Detectable Signal / Detection Levels
NPN	5.1 KOhms	±30 VDC	'0' level <1 V, '1' level >2 V
PNP	5.1 KOhms	±30 VDC	'0' level <1 V, '1' level >2 V
Mechanical	5.1 KOhms	±30 VDC	'0' level <1 V, '1' level >2 V
Reed	5.1 KOhms	±30 VDC	'0' level <1 V, '1' level >2 V
Pick-Up	100 KOhms	±30 VDC	>10 mVpp
Namur	5.1 KOhms	±30 VDC	--
TTL	5.1 KOhms	±30 VDC	'0' level <1V, '1' level >2V
<600 VAC	900 KOhms	800 VAC	--
<60 VAC	340 KOhms	200 VAC	--

Model Number	Description
DR-I4E	Signal converter for electrical signals, isolated, for industrial applications
DR-I4F	Signal converter for impulses and frequency signals, isolated, for industrial applications
DR-I4L	Signal converter for load cells and millivolts, isolated, industrial applications
DR-I4P	Signal converter for process and temperature signals, isolated, industrial applications