

D20 Analog Input Module



Overview

The D20 Analog module is composed of two detachable modules, WESTERM D20 A and WESDAC D20 A. The bottom module, WESTERM D20 A, is where all field wirings are terminated. The top module, WESDAC D20 A, processes the data acquired and communicates this to the main D20 processor, see Figure 2.

The WESTERM D20 A is the termination module for the WESDAC D20 A analog input module. All field, I/O, and power terminations for the WESDAC D20 A are made on the WESTERM D20 A. Up to 32 analog inputs can be accommodated on compression type terminations. Through the use of input adapter modules, individual inputs can be configured for voltage or current. Voltage ranges currently accepted are 1, 5 or 10 volt full scale unipolar or bipolar. Current inputs are sampled via a shunt resistor and therefore almost any common current range can be accepted. A wetting source is supplied for current loop inputs.

Capacitors and varistors are equipped to provide Surge Withstand Capability (SWC) as well as impulse protection on all field inputs. Loop voltage for field transducers can be provided on an individual input basis. The voltage source can be either the input to the WESDAC D20 A or an external source.

Two DB 9 connectors are provided to allow daisy chaining of the D.20 Link. This link provides the communication channel over which the main D20 CPU processor, the WESDAC D20 M, can communicate with the WESDAC D20 A. Power for the WESDAC D20 A is also provided over the same cable assembly. The power is fused and filtered by passive components on the WESTERM D20 A.

A single DB 9 connector is provided for the WESMAINT D20 maintenance port. This port allows communications between a VT 100 terminal or emulator, and the WESDAC D20 A. Module input data as well as diagnostic information can be viewed over the maintenance port. The address jumper block for the WESDAC D20 A is located on the WESTERM D20 A. The address on the jumper block corresponds to the module's address on the D.20 link.

The WESDAC D20 A is physically mounted on and electrically connected to the WESTERM D20 A through three 40 pin connectors. The two modules are mounted on a 19 inch rack and all field terminations are wired into the WESTERM D20 A.

Only passive components are mounted on the WESTERM D20 A leaving all the active components on the WESDAC D20 A. This arrangement simplifies in field repair of the unit since the WESDAC D20 A can be replaced without disturbing any of the field wiring.

Efficient, Cost Effective I/O Solutions

- The I/O modularity allows for efficient distributed I/O installations - minimizing wiring and enclosure requirements; this eliminates panel and reduces cost
- The active/passive design of the WESDAC/ WESTERM I/O modules allows users to quickly test, commission, and troubleshoot via hot swappable WESDAC modules, without disturbing wiring connections; this significantly speeds up and simplifies maintenance activities

Ease of Use

- To first time users, both the software configuration work and hardware installations are trivial; this makes it simple to install and maintain the I/O modules

Flexible and Reliable Operations

- D20A supports up to 32 bipolar or unipolar inputs, including auto-calibration of inputs using precision scaling resistors
- I/O modules are available to be ordered with either a DNP3 communication protocol option or a Standard/ Redundant D.20 link option - the D.20 link is a GE proprietary protocol



Distributed I/O Architecture

The D20 Remote Terminal Unit (RTU) design is based on a distributed-processing architecture including real-time data acquisition and control software. These I/O modules can be located close to the primary equipment being monitored and controlled as they receive and send data back to the master D20 main processor.

The I/O modules are intelligent modules that contain on-board microprocessors and are configured as slave devices to the D20 main processor. In the Figure 1 pictorial setup, specific I/O processing is distributed throughout the D20 RTU to the appropriate I/O modules.

The I/O modules support two communication protocols: (1) DNP 3 protocol, and (2) high speed, high-level data link controller (D.20 Link, HDLC) protocol. The peripheral modules have serial communication ports and various types of field connections.

The hardware construction of each remote I/O module type is similar (see Figure 2.)

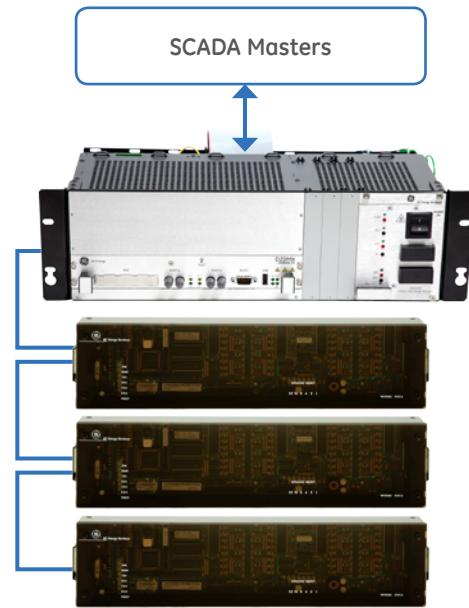
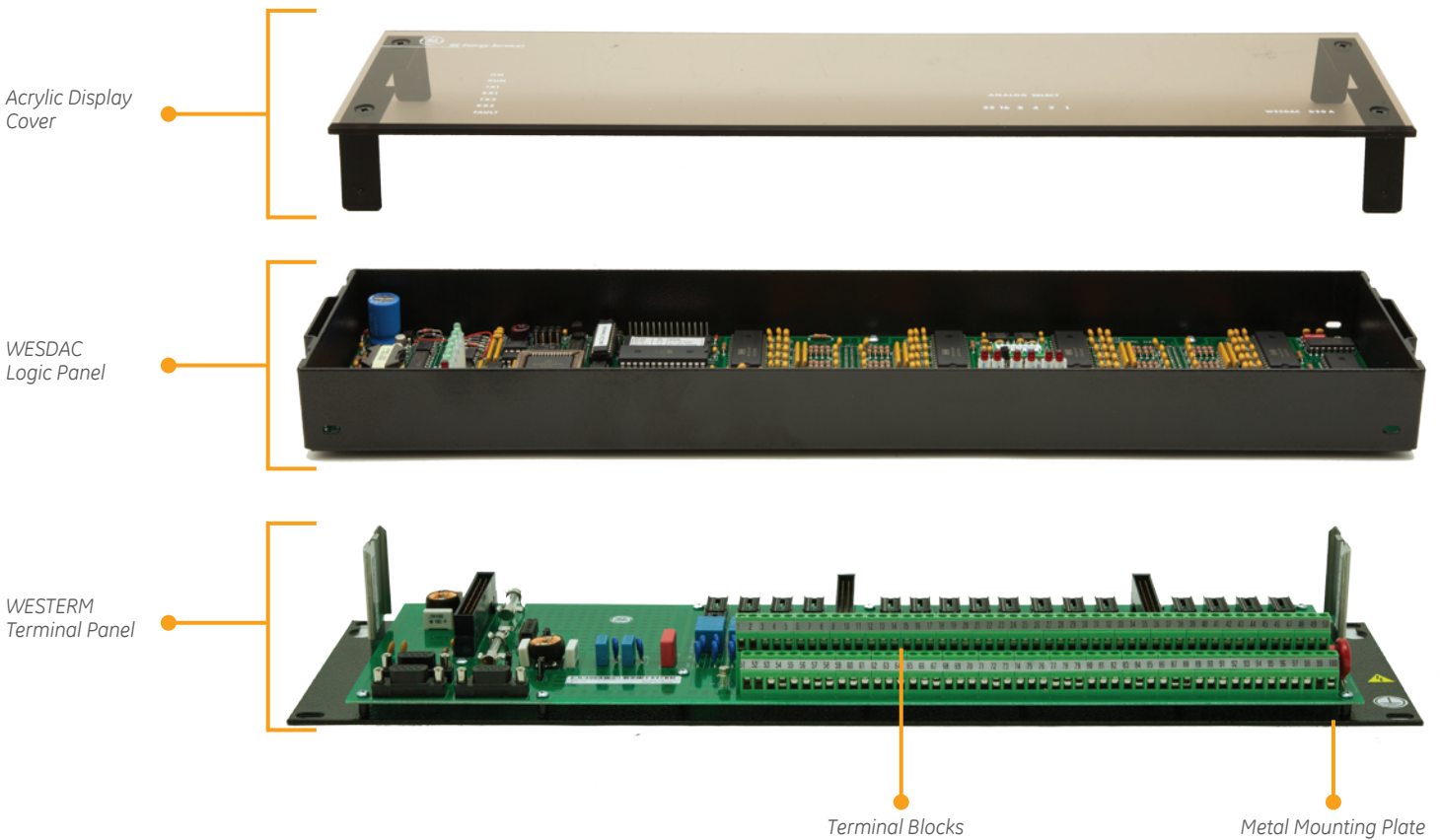


Figure 1: Simple architecture of I/O modules communicating to the D20 RTU

Figure 2: Architecture of I/O logic and termination panels



Data Processing

D20 I/O peripherals provide specialized processing and storing/buffering functions for analog inputs/outputs by gathering data from field sources or acting as an output unit to interface with field devices.

I/O processing provides flexible, reliable, robust operation and is configurable on a per-point or per-system basis.

Table 1: I/O Processing

TYPE	DESCRIPTION
Analog Input	<ul style="list-style-type: none"> Line noise filtering Deadbanding

The D20A is capable of processing standard voltage and current inputs continuously. It supports the following:

- Programmable Input Ranges: A programmable gain instrument amplifier permits programming of voltage input ranges. Ranges are stored in RAM on a per-point basis. (+/- 1, +/-5, +/- 10 V scale).
- Variable Scan Rate: Programmable scan rate from 17.2 to 20.5 ms (50/60 Hz) on a per module basis.
- 32 Differential Analog Inputs and eight internal references using synchronous integrating-type analog-to-digital (A/D) converters.
- A/D Conversion provides excellent normal-mode rejection characteristics while maintaining very good response times (approximately 550 ms total).

Termination Types

D20 Analog I/O module can be ordered with the following field termination options:

Table 2: D20 I/O Peripherals

PERIPHERAL	I/O SUPPORT	TERMINATION
D20A	32 analog inputs, standard version	Compression
D20AD	32 analog inputs, standard version	DB25
D20AX	32 analog inputs, standard version	Disconnect
D20AB	32 analog inputs, standard version	Barrier
D20AZ	32 analog inputs, high-voltage version	Compression

Technical Specifications

Table 3: D20A Specifications

ITEM	DESCRIPTION
Processor	8 bit Freescale 68HC11 MPU
Clock	2 MHz MPU clock
Memory	<ul style="list-style-type: none"> 32 KB EPROM 24 KB static RAM 512 bytes EEPROM
Inputs	32 differential inputs (typical): <ul style="list-style-type: none"> ±5, ±10 V ±1, ±2.5, ±5, ±10, ±20 mA
Input Impedance	44 Mohm ±5% (VDC)
Overall Accuracy	±0.05% (voltage), ±0.1% (current)
Temperature Coefficient	±10 ppm per °C
Resolution	14 bit plus sign
Conversion Rate (all 32 inputs)	<ul style="list-style-type: none"> 550 ms @ 60 Hz 656 ms @ 50 Hz
Over voltage Rating	35 VDC
Overload Rating	200 V pp ±5 V input common mode (50/60 Hz)
Common Mode Rejection (60 Hz)	<ul style="list-style-type: none"> 95 dB 5 V 90 dB 10 V
Normal Mode Rejection (60 Hz)	60 dB
Component Isolation Rating	1500 Vrms
Dielectric Rating	1000 VDC
D.20 Link Ports	2
Maintenance Port	9600 baud, RS-232
Power Requirements	20 60 VDC, 7 W typical
Size	19" x 5.25" x 2.5"
LED Indicators	<ul style="list-style-type: none"> Common LEDs RED binary point LEDs, indicating the analog point that is currently being read

Ordering

D20A System Components

Please note

- For the rules regarding the combination of various options to build an order code, visit the online web:
<http://store.gedigitalenergy.com/ViewProd.asp?Model=D20A>
- This ordering guide should ONLY be used with reference to the product documentation and it is assumed the user has read those documents. The ordering guide is for the use of experienced users who have extensive knowledge in the area and the products.
- The order defined in the ordering guide may not be final and can only be accepted once GE has reviewed and accepted the order. This document is only meant as a guide and by no means will portray the final order.
- GE reserves the rights to change or modify the document without notice. The user is responsible to contact GE before placing an order to ensure the accuracy of the order code built.

D20A -	*	*	*	*	*	*	*	Description	Equivalent Legacy #
D20A Termination	1							D20A 32 Inputs, LV (20-60VDC or D.20 Power) Compression Termination	517-0163
	2							D20AD 32 Inputs, LV (20-60VDC or D.20 Power) DB25 Termination	517-0178
	3							D20AX 32 Inputs, LV (20-60VDC or D.20 Power) Compression Disconnect Termination	517-0216
	4							D20AB 32 Inputs, LV (20-60VDC or D.20 Power) Barrier Termination	517-0328
	5							D20AZ 32 Inputs HV (40-150VDC) Compression Termination	517-0240
	6							D20AZ 32 Inputs HV (40-150VDC) High Voltage Break Away W/Terminal Blocks	517-0364
	8							D20A 32 Inputs, LV (20-60VDC or D.20 Power) Compression termination (Conformal Coat)	517-0163-CC
	9							D20AD 32 Inputs, LV (20-60VDC or D.20 Power) DB25 Termination (Conformal Coat)	517-0178-CC
	A							D20AX 32 Inputs, LV (20-60VDC or D.20 Power) Compression Disconnect Termination (Conformal Coat)	517-0216-CC
	B							D20AZ 32 Inputs HV (40-150VDC) Compression Termination (Conformal Coat)	517-0240-CC
C							D20AZ 32 Inputs HV (40-150VDC) Compression Termination (Epoxy Conformal Coat)	517-0240-ECC	
D20A Analog Adaptors	U							None	
	1							Voltage Input Adaptor +/- 1V +/- 5V, +/- 10V DC (set of 32)	
	2							1 MA / 1V Current Input Adaptor (set of 32)	
	3							10 MA / 5V Current Input Adaptor (set of 32)	
	4							1 MA / 5V Current Input Adaptor (set of 32)	
	5							1.2 MA / 1V Current Input Adaptor (set of 32)	
	6							2 MA / 5V Current Input Adaptor (set of 32)	
	7							20 MA / 5V Current Input Adaptor (set of 32)	
	9							1 MA / 5V Current Input Adaptor (High Precision) (set of 32)	
	A							1.5 MA / 5V Current Input Adaptor (set of 32)	
	B							2 MA / 5V Current Input Adaptor (High Precision 0.01%) (set of 32)	
	C							20MA / 1V Current Input Adaptor (set of 32)	
	D							1.5MA / 1V Current Input Adaptor (set of 32)	
G							5MA / 1V Current Input Adaptor (set of 32)		
J							2.5MA / 5V Current Input Adaptor (set of 32)		
N							1.1MA / 5V Current Input Adaptor (set of 32)		
P							1.25MA / 5V Current Input Adaptor (set of 32)		
Q							12.8MA / 5V Current Input Adaptor (set of 32)		
PCommon	U							None	
	1							PCommon 212 (SBA0001/00)	
	2							PCommon 213 (SBA0003/00)	
	3							PCommon 220 (SBA0004/00)	
	4							PCommon 221 (SBA0007/00)	
	5							PCommon 300 (SBA0005/00)	
	6							PCommon 301 (SBA0006/00)	
	7							PCommon 305 (SBA0009/00)	
8							PCOMMON 306 (D20A, D20S, D20K)		
Cable	U							Cable Not Required	
	1							D.20 Cable 12 Inches Long	
	2							D.20 Cable 18 Inches Long	
	3							D.20 Cable 24 Inches Long	
	4							D.20 Cable 36 Inches Long	
	5							D.20 Cable 48 Inches Long	
	6							D.20 Cable 72 Inches Long	
	7							D.20 Cable 96 Inches Long	
	8							D.20 Cable 120 Inches Long	
D.20 Terminator	U							D.20 Terminator Not Required	
	1							D.20 Terminator (One Required per D.20 Link)	
D.20 Duct Panel	U							Duct Panel Not Required	
	1							Cable Duct Panel, Tie Wrap Connections	
	2							Two Cable Duct Panels, Tie Wrap Connections	
	3							Cable Duct Panel, No Through Holes	
	4							Two Cable Duct Panels, No Through Holes	
	5							Cable Duct Panel, Through Holes at Each End	
6							Two Cable Duct Panels, Through Holes at Each End		
Second D.20 LAN	U							Second D.20 LAN Port Not Required	
	A							WESDAC D20 ASK D.20 I/F	

D20A Spare Components

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<http://store.gedigitalenergy.com/ViewProd.asp?Model=D20A+Spare+Parts>
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D20A -	*	*	*	*	*	*	*	*	*	Description
Module Type	U 3 D T									None (Need ONLY Analog Adapter Packs) D20 DNP 3 I/O Module D.20 Analog WESDAC Module D.20 Analog WESTERM Module
Input Voltage to Module		U H L M								None (Need ONLY RNET Voltage Adapter Packs) High Voltage (40-150VDC) Low Voltage (20-60 VDC or D.20 Link Power) Low Voltage OSD (40-60 VDC or D.20 Link Power)
Termination Type			U B D P X							None Barrier Termination Type DB25 Termination Type Compression Termination Type Compression/Disconnect Termination Type
Environmental Protection				U C E						None Conformal Coat Epoxy-Conformal Coat
D.20 Link					U R L S					None WESTERM Redundant D.20 Link & Dual Power Supply Option (540-0313) WESDAC Redundant D.20 Link & Dual Power Supply Option (540-0207) Standard D.20 Link [For Module type T, or D]
Adaptor Pack						U 1 2 3 4 5 6 7 9 A B C D G J N P Q H				None Voltage Input Adaptor +/- 1V +/- 5V, +/- 10V DC (set of 32: 530-0004) 1 MA /1V Current Input Adaptor (set of 32: 530-0005) 10 MA /5V Current Input Adaptor (set of 32: 530-0045) 1 MA /5V Current Input Adaptor (set of 32: 530-0050) 1.2 MA /1V Current Input Adaptor (set of 32: 530-0025) 2 MA /5V Current Input Adaptor (set of 32: 530-0051) 20 MA /5V Current Input Adaptor (set of 32: 530-0052) 1 MA /5V Current Input Adaptor (High Precision) (set of 32: 530-0090) 1.5 MA /5V Current Input Adaptor (set of 32: 530-0095) 2 MA /5V Current Input Adaptor (High Precision 0.01%) (set of 32: 530-0108) 20MA /1V Current Input Adaptor (set of 32: 530-0003) 1.5MA /1V Current Input Adaptor (set of 32: 530-0030) 5MA /1V Current Input Adaptor (set of 32: 530-0073) 2.5MA /5V Current Input Adaptor (set of 32: 530-0085) 1.1MA /5V Current Input Adaptor (set of 32: 530-0091) 1.25MA /5V Current Input Adaptor (set of 32: 530-0094) 12.8MA /5V Current Input Adaptor (set of 32: 530-0131) 50MA /5V Current Input Adaptor (set of 32: 530-0086)
PCOMMON								U 1 2 3 4 5 6 7 8		None PCCommon 212 (SBA0001/00) PCCommon 213 (SBA0003/00) PCCommon 220 (SBA0004/00) PCCommon 221 (SBA0007/00) PCCommon 300 (SBA0005/00) PCCommon 301 (SBA0006/00) PCCommon 305 (SBA0009/00) PCOMMON 306 (P010-0 VER.306)
Input Line Frequency									U A B	None 50 Hz Configuration 60 Hz Configuration

D20A Spare Cross-Reference

LEGACY PART NUMBER AND DESCRIPTION	SMART CATALOG NUMBER PREFIX AND DESCRIPTION
WESTERM MODULES - LEGACY PART NUMBER	WESTERM MODULES - NEW PART NUMBER PREFIX
(517-0163) - WESTERM D20A TYPE 1 VERSION 1	(D20A-TL-P-U)- D20A 32 inputs, LV Power input (20-60VDC or D.20), compression termination
(517-0163-CC) - WESTERM D20A TYPE 1 VERSION 1 Conformal Coated	(D20A-TL-P-C)- D20A 32 inputs, LV Power input (20-60VDC or D.20), compression termination, conformal coated
(517-0240) - WESTERM D20 AZ	(D20A-TH-P-U)- D20AZ 32 inputs, HV Power input (40-150VDC), compression termination
(517-0240-CC) - WESTERM D20 AZ Conformal Coated	(D20A-TH-P-C)- D20AZ 32 inputs, HV Power input (40-150VDC), compression termination, conformal coated
(517-0240-ECC) - WESTERM D20 AZ - Epoxy Conformal Coated	(D20A-TH-P-E)- D20AZ 32 inputs, HV Power input (40-150VDC), compression termination, epoxy conformal coated
(517-0328) - WESTERM D20AB	(D20A-TL-B-U)- D20AB 32 inputs, LV Power input (20-60VDC or D.20), barrier termination
(517-0328-CC) - WESTERM D20AB Conformal Coated	(D20A-TL-B-C)- D20AB 32 inputs, LV Power input (20-60VDC or D.20), barrier termination, conformal coated
(517-0178) - WESTERM D20 AD	(D20A-TL-D-U)- D20AD 32 inputs, LV Power input (20-60VDC or D.20), DB25 termination
(517-0178-CC) - WESTERM D20 AD Conformal Coated	(D20A-TL-D-C)- D20AD 32 inputs, LV Power input (20-60VDC or D.20), DB25 termination, conformal coated
(517-0251) - WESTERM D20 OAD	(D20A-TM-D-U)- D20OAD 32 inputs, LV Power Input (40-150VDC), DB25 termination, redundant D.20 link and PS input
(517-0216) - WESTERM D20AX W/TB PLUGS	(D20A-TL-X-U)- D20AX 32 inputs, LV Power input (20-60VDC or D.20), compression disconnect termination
(517-0216-CC) - WESTERM D20AX W/TB PLUGS Conformal Coated	(D20A-TL-X-C)- D20AX 32 inputs, LV Power input (20-60VDC or D.20), compression disconnect termination, conformal coated
(517-0364) - WESTERM D20AZ BREAK AWAY W/TBS	(D20A-TH-X-U)- D20AZ 32 inputs, HV Power input (40-150VDC), compression disconnect termination
WESDAC MODULES - LEGACY PART NUMBER	WESDAC MODULES - NEW PART NUMBER PREFIX
(511-0101) - WESDAC D20A TYPE 1 VERSION 1	(D20A-DL-U-U)- WESDAC D20A LV
(511-0101-CC) - WESDAC D20A TYPE 1 VERSION 1 Conformal Coated	(D20A-DL-U-C)- WESDAC D20A LV Conformal Coated
(511-0103) - WESDAC D20A HV2	(D20A-DH-U-U)- WESDAC D20A HV
(511-0103-CC) - WESDAC D20A HV2 Conformal Coated	(D20A-DH-U-C)- WESDAC D20A HV Conformal Coated
(511-0103-ECC) - WESTERM D20SX W/TB PLUGS	(D20A-DH-U-E)- WESDAC D20A HV Epoxy Conformal Coated
DNP I/O MODULE SPARES - LEGACY PART NUMBER	DNP I/O MODULE SPARES - NEW PART NUMBER PREFIX
(511-0301) - DNP I/O MODULE - DC ANALOG INPUT	(D20A-3L-U-U)-WESDAC D20A LV, DNP3 Communications
(511-0301-CC) - DNP I/O MODULE - DC ANALOG INPUT Conformal Coated	(D20A-3L-U-C)-WESDAC D20A LV, DNP3 Communications, Conformal Coated
(511-0303) - DNP I/O MODULE - DC ANALOG INPUT HV	(D20A-3H-U-U)- WESDAC D20A HV, DNP3 Communications
D20ANALOG ADAPTORS - LEGACY PART NUMBER	ADAPTER PACK - NEW PART NUMBER
(530-0004) - ANALOG ADAPTOR, I/P VOLTAGE	(D20A-U-U-U-U-U-1-U-U) - Voltage Input adaptor - /+ 1, +/- 5, +/- 10 VDC (Set of 32: 530-0004)
(530-0005) - ANALOG ADAPTOR, I/P 1mA/1V	(D20A-U-U-U-U-U-2-U-U) - 1 mA / 1V current input adaptor (Set of 32: 530-0005)
(530-0045) - ANALOG ADAPTOR, I/P 2MA/1V	(D20A-U-U-U-U-U-3-U-U) - 10 mA / 5V current input adaptor (Set of 32: 530-0045)
(530-0050) - 1MA/5V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-4-U-U) - 1 mA / 5V current input adaptor (Set of 32: 530-0050)
(530-0025) - 1.2MA/1V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-5-U-U) - 1.2 mA / 1V current input adaptor (Set of 32: 530-0025)
(530-0051) - ANALOG ADAPTOR, I/P (2MA/5V)	(D20A-U-U-U-U-U-6-U-U) - 2 mA / 5V current input adaptor (Set of 32: 530-0051)
(530-0052) - ANALOG ADAPTOR, I/P 20MA/5V	(D20A-U-U-U-U-U-7-U-U) - 20 mA / 5V current input adaptor (Set of 32: 530-0052)
(530-0090) - ANALOG ADAPTOR, I/P 1MA/5V	(D20A-U-U-U-U-U-9-U-U) - 1 mA / 5V current input adaptor, high precision (Set of 32: 530-0090)
(530-0095) - ANALOG ADAPTOR, I/P 1.5MA/5V	(D20A-U-U-U-U-U-A-U-U) - 1.5 mA / 5V current input adaptor (Set of 32: 530-0095)
(530-0108) - ANALOG ADAPTOR, 2MA/5V I/P .01%	(D20A-U-U-U-U-U-B-U-U) - 2 mA / 5V current input adaptor, high precision 0.01% (Set of 32: 530-0108)
(530-0003) - ANALOG ADAPTOR, I/P 20MA/1V	(D20A-U-U-U-U-U-C-U-U) - 20mA/1V current input adaptor (Set of 32: 530-0003)
(530-0030) - 1.5MA/1V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-D-U-U) - 1.5 mA / 1V current input adaptor (Set of 32: 530-0030)
(530-0073) - 5MA/1V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-G-U-U) - 5mA/1V current input adaptor (Set of 32: 530-0073)
(530-0085) - 2.5MA/5V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-J-U-U) - 2.5mA/5V current input adaptor (Set of 32: 530-0085)
(530-0091) - 1.1MA/5V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-N-U-U) - 1.1mA/5V current input adaptor (Set of 32: 530-0091)
(530-0094) - ANALOG ADAPTOR, I/P 1.25MA/5V	(D20A-U-U-U-U-U-P-U-U) - 1.25mA/5V current input adaptor (Set of 32: 530-0094)
(530-0131) - ANALOG ADAPTOR 12.8MA/5V	(D20A-U-U-U-U-U-Q-U-U) - 12.8mA/5V current input adaptor (Set of 32: 530-0131)
(530-0086) - 50MA/5V I/P ANALOG ADAPTOR	(D20A-U-U-U-U-U-H-U-U) - 50mA/5V current input adaptor (Set of 32: 530-0086)

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