Conditioner cards for EDX series

CDV-40B (-F)   CDV-44AS   CDA-44AS/45AS   CVM-41A   DPM-42B (-F)

CT-2A   CTA-40A   CFV-40A   CCA-40A (-F)   CAN-41A   AD-40AS (-F)

●EDX-100A, EDX-200A, and EDX-5000A conditioner cards specifications

■Strain/Voltage Measurement Card CDV-40B*, CDV-40B-F

For measuring both strain (Strain gages and strain-gage transducers) and voltage (Model with antialiasing LPF is the CDV-40B-F)

*Models with output are available, inquires are welcome.

Items	Strain	Voltage
Channels	8 (Integrated connector)	
Input Modes	Balanced differential	Unbalanced
Input Resistance	Approx. (10 + 10 MΩ)	Approx. 1 MΩ
Coupling	DC/AC (DC cut)	
Applicable Gage Factor	2.00	——
Bridge Excitation	2.00 VDC ±2% (120 to 1k Ω)	——
Balance Adjustment	Resistance ±2.4% (±12000 μm/m)	——
Measuring Range	500, 1 k, 2 k, 5 k, 10 k, 20 k, 50 k [μm/m], OFF	0.1, 0.2, 5, 1, 2, 5, 10 V, OFF
Range Accuracy	±0.2% FS, each range	
Calibration	±100%, ±50%, each range	
Nonlinearity	±0.1% FS	
Frequency Response	DC coupling: DC to 50 kHz, deviation: 1 to -3 dB AC coupling (DC cut): 0.2, 1 Hz to 50 kHz (See the HPF)	
LPF	Transfer characteristics: 2nd order Butterworth Cutoff frequencies: 8 steps of 10, 30, 100, 300, 1 k, 3 k, 10 k [Hz] and FLAT Amplitude ratio at cutoff point: -3±1dB Attenuation: (-12±1) dB/oct.	
Antialiasing LFP (CDV-40B-F only)	8th order Butterworth Cutoff frequencies: Automatically set at sampling frequencies: x 0.25 Attenuation: -48 dB±5 dB (At sampling frequency x 0.5, and LPF is set to AUTO)	
HPF (DC cut)	Cutoff frequencies: 0.2, 1 Hz Attenuation: -6 dB/oct.	
A/D converter	16 bits	
TEDS	Reads information from TEDS-installed sensors	
EMC Directive	EN61326-1 (Class A)	

Optional Accessories	●Conversion adapter FV-1A ●8-channel input cable U-38 (1.5 m), U-39 (1 m), U-40 to 48 (50 cm)

Note: If the transducer with a remote-sensing function, a 4-conductor extension cable (N-81 (5 m) to N-85 (50 m)) enables measurement. But the remote-sensing function will be ineffective.

■Strain/Voltage Measurement Isolation Card CDV-44AS

Measurement card strong against common mode noise even in workplaces with power machinery.

Measuring Targets	Strain gages (Full-bridge system)
	Strain-gage transducers, voltage
Channels	4
Input Resistance	Approx. 10 + 10 MΩ (Strain mode)
	Approx. 1 MΩ (Voltage mode)
Input Format	Balanced differential input (Strain mode)
	Unbalanced input (Voltage mode)
IMRR	120 dB (When 500 μm/m range)
Gage Factor	2.00 fixed (Strain mode)
Frequency Response	With DC coupling DC to 5 kHz, deviation within +1 dB, -3 dB
	DC cut (With AC coupling) 0.2 Hz (See the HPF)
Bridge Excitation	Within 2 VDC±2% (Strain mode)
Range Accuracy	Within ±0.3%FS
Applicable Bridge Resistance	120 to 1000 Ω (Strain mode)
Measuring Range	500, 1 k, 2 k, 5 k, 10 k, 20 k μm/m strain, and OFF (Strain mode)
	1, 2, 5, 10, 20, 50 V, and OFF (Voltage mode)
Balance Adjustment Range	Within ±2.4% (±12000 μm/m) (At strain measurement)
	Within ±5 V (At voltage measurement)
ZERO Accuracy	Within ±0.3% FS (Voltage OFF mode)
Nonlinearity	Within ±0.1%FS
Calibration Values (CAL)	Output at ±100% and ±50% of each range Accuracy: Within ±0.3%FS
Monitor Output	Accuracy: Within ±5 V±0.5% (±5 V to full scale of each range)
LPF	Transfer characteristic: 2nd order Butterworth
	Cutoff frequency: 10, 30, 100, 300, 1 k, Hz and FLAT (6 steps)
	Amplitude ratio: -3 ±1 dB (At cutoff point)
	Attenuation: (-12±1) dB/oct.

HPF	Cutoff frequencies: 0.2 Hz
	Attenuation: Within (-6±1) dB/oct.
A/D Converter	16 bits
TEDS	Reads information from TEDS-installed sensors
Isolation	Between input and case (Output)
	Between channels: Withstand voltage 500 VDC, 1 min.

Standard Accessories

Voltage conversion adapter for isolation amplifier (FV-2A ×4)

Optional Accessories

Monitor output cable U-64 (2 m)
Note: If the transducer with a remote-sensing function, a 4-conductor extension cable (N-81 (5 m) to N-85 (50 m)) enables measurement. But the remote-sensing function will be ineffective.

■ Constant Current Amplifier Card CDA-44AS,45AS

Measurement card capable of handling cable extension

Measuring Target	Strain gages (Full bridge system)
	Strain-gage transducers, voltage
Channels	4
Input Resistance	Approx. 10 + 10 MΩ (Strain mode)
	Approx. 1 MΩ (Voltage mode)
Input Format	Balanced differential input (Strain mode)
	Unbalanced input (Voltage mode)
IMRR	120 dB (When 500 μm/m range)
Frequency Response	DC coupling: DC to 200 Hz,
	deviation within +1 dB, -3 dB
	DC cut (AC coupling): 0.2 Hz (See the HPF)
Gage Factor	2.00 fixed (Strain mode)
Bridge Excitation	
CDA-44AS:	Approx. DC 16.7 mA (Constant current) when gage resistance 120 Ω connected
	*If sensitivity or temperature resistance is in the transducer bridge excitation lines, then sensitivity and temperature characteristics are not corrected.
CDA-45AS:	Approx. DC 5.7 mA (Constant current) when gage resistance 350 Ω connected
	*If sensitivity or temperature resistance is in the transducer bridge excitation lines, then sensitivity and temperature characteristics are not corrected.
Cable Length	Within 500 m (0.5 mm² cable)
Range Accuracy	Within ±0.3%FS
Measuring Range	500, 1 k, 2 k, 5 k,10 k, 20 k μm/m, OFF (Strain mode)
	1, 2, 5, 10, 20, 50 V, OFF (Voltage mode)
Balance Adjustment	Within ±2.4% (±12000 μm/m)
	(At strain measurement)
	Within ±5 V (At voltage measurement)
ZERO Accuracy	Within ±0.3% FS (Voltage OFF mode)
Nonlinearity	Within ±0.1%FS
Calibration (CAL)	Output at ±100% and ±50% of each range
	Accuracy: Within ±0.3%FS
Monitor Output	Accuracy: Within ±5 V ±0.5%
LPF	Transfer characteristic: 2nd order Butterworth
	Cutoff frequencies: 1, 3, 10, 30, 100 Hz and FLAT (6 steps)
	Amplitude ratio: -3 ±1 dB (At cutoff point)
	Attenuation: (-12±1) dB/oct.
HPF	Cutoff frequencies: 0.2 Hz
	Attenuation: Within (-6±1) dB/oct.
A/D Converter	16 bits
TEDS	Reads information from TEDS-installed sensors
Isolation	Between input and case (Output)
	Between channels: Withstand voltage 500 VDC,
	1 min.

Standard Accessories

Conversion adapter for isolation amplifier (FV-2A ×4)

Optional Accessories

Monitor output cable U-64 (2 m)
Note: If the transducer with a remote-sensing function, a 4-conductor extension cable (N-81 (5 m) to N-85 (50 m)) enables measurement. But the remote-sensing function will be ineffective.

■ Strain/Voltage/Acceleration Measurement Card CVM-41A

A high resolution conditioner card for measuring strain, voltage, and acceleration (Piezoelectric sensor with an amplifier built in)

Items	Strain measurement	Voltage measurement	Acceleration measurement (piezoelectric)
Applicable Recorders	EDX-100A, EDX-200A, and EDX-5000A8		
Channels			
Measuring Targets	Strain gages *1 Strain-gage transducers	Voltage	Piezoelectric accelerometers (Built-in amplifier)
Input Modes	Balanced differential input	Balanced differential input*2*3	Unbalanced input*4
Input Impedance	——	(1 + 1 MΩ) Within ±10%*5	——
Bridge Excitation or Power supply to sensors (Each channel settable *6)	Const. voltage output BV2V: 2 VDC BV5V: 5 VDC BV10V: 10 VDC	Const. voltage output BV2V: 2 VDC (± 1 V) BV5V: 5 VDC (± 2.5 V) BV10V: 10 VDC (± 5 V) or OFF 20 mA/channels or less	Const. current output: Approx. 4 mA Excitation voltage: Approx. 23 VDC Load: 1 kΩ or less
Applicable gage factor	2.00 fixed	——	——
Applicable Bridge Resistance	BV2V: 120 to 1000 Ω BV5V: 350 to 1000 Ω BV10V: 500 to 1000 Ω	——	——
Balance Operation Settings (Zero suppression)	[Autobalance enabled] Cancel the unbalanced bridge portion in the analog circuit, and zero the measurement value. [Autobalance disabled] Do not cancel the unbalanced bridge portion (The initial unbalanced value in the bridge circuit can be confirmed)	[Zero suppression enabled] Cancel the input voltage in the analog circuit, and zero the measurement value [Zero suppression disabled] Do not cancel the input voltage in the analog circuit (Display the input voltage as is)	——
Balance Adjustment Range	BV2V: Resistance ±10% (±50 k μm/m) BV5V: Resistance ±4% (±20 k μm/m) BV10V: Resistance ±2% (±10 k μm/m)	±5 V	——
Measuring Range	BV2V: 5 k, 10 k, 20 k, 50 k, 100 k, 200 k, 500 k μm/m BV5V: 5 k, 10 k, 20 k, 50 k, 100 k, 200 k μm/m BV10V: 2 k, 5 k, 10 k, 20 k, 50 k, 100 k μm/m	1, 2, 5, 10, 20, and 50 V	100, 200, 500, 1000, 2000, and 5000 mV
Range Accuracy	Within ±0.2%FS		Within ±1.0%FS
Nonlinearity	Within ±0.1%FS		Within ±0.2%FS
Calibration (CAL) SHUNT CAL	±100% and ±50% of each range and SHUNT *7	±100% and ±50% of each range	
Frequency Response	DC coupling: DC to 5 kHz, deviation +1dB, -3dB AC coupling: 0.2, 1 Hz to 5 kHz (See the HPF.)		0.5 Hz to 5 kHz Deviation +1dB, -3dB
LPF	Transmission characteristics: 5 Butterworth type Cutoff frequencies: 30, 100, 300, 1 k, 3 kHz, FLAT, and AUTO *8 Cutoff accuracy: within -3±1 dB Attenuation: (-30±3) dB /oct.		
HPF	Cutoff frequencies: 0.2 Hz, 1 Hz Attenuation: -6dB / oct.		——
Resolution	24 bits *9		
Distortion Rate	——		1% or less
Monitor Output	Accuracy: Within ±5 V ±0.5% (With ±FS), Nonlinearity: Within ±0.5%FS		
Dimensions	22 W × 119 H × 213 D mm (Excluding protrusions)		
Weight	Approx. 400 g		
TEDS	Reads information from TEDS-installed sensors		
EMC Directive	EN61326-1 (Class A)		
RoHS Directive	EN50581		

*1 For strain measurement, using bridge boxes
*2 When using the Conversion Adapter FV-1A, this becomes unbalanced input
*3 Common mode input voltage range ±20 VDC, absolute input voltage range ±50 V
*4 Conversion Adapter FV-1A usage possible
*5 When using Conversion Adapter FV-1A (At unbalanced input), within 1 MΩ±10%
*6 The max. channels of CVM-41A in EDX-100A is 3 times of units of CVM
*7 When SHUNT CAL has 350 Ω load connected, Approx. 257 μm/m output
*8 With AUTO settings, the cutoff frequency is set to 1/4 of the sampling frequency
*9 When installed in EDX-100A, its resolution becomes 16 bits.
Note: Transducer with remote sensing use N-81 (5 m) to N-85 (50 m)

Standard Accessories

2 cross recessed binding head screw M3x6

Optional Accessories

CCA input cable U-111 (1 m)
CVM input cable U-121 (0.5 m), U-122 (1.0 m), U-123 (1.5 m)
CVM input integrated cable N-121 (1.5 m)
Integrated output cable U-62 (1.1 m)
Conversion adapter FV-1A
Voltage input box VI-8A (-T)
Bridge box for quarter bridge
  DBS-120B-8 (C) (T), DBS-350B-8 (C) (T)
One-touch type bridge box DBV-120A-8 (C), DBV-350A-8 (C)

Data Recorders/Analyzers

■Dynamic Strain Measurement Card DPM-42B, DPM-42B-F (*1) DPM-42B-I (*2), DPM-42B-I-F (*1,*2)

A carrier wave type card for measuring low level strain. It is isolated between input and output, and between channels.
*1: With antialiasing LPF *2: Low inverter noise type

Measuring Targets Strain gages, strain-gage transducers

Channels 4

Frequency Response DC to 5 kHz (Deviation: ±10%)

Carrier Wave Frequency 12 kHz

Applicable Bridge Resistance 120 to 1000 Ω

Gage Factor 2.00 fixed

Bridge Excitation 2 Vrms, 0.5 Vrms switching, 12 kHz sine wave

Balance Adjustment Range
  Resistance: ±2.4% (±12000 μm/m)
  Capacity: 2000 pF

Balance Adjustment Methods
  Resistance: Pure electronic auto balance (Saved in nonvolatile memory)
  Capacity: CST method (Automatic tracking)

Measuring Range With bridge excitation 2 Vrms: 200, 500,
  1 k, 2 k, 5 k, 10 k, 20 k μm/m and OFF - 8 steps
  With bridge excitation 0.5 V rms: 1 k, 2 k, 5 k, 10 k, 20 k, 50 k μm/m
  and OFF – 7 steps

Calibration Values (CAL) Output at ±100% and ±50% of each range

Nonlinearity Within ±0.2%FS

LPF Transfer characteristic: 2nd order Butterworth
  Cutoff frequencies: 10, 30, 100, 300, 1 k Hz and FLAT (6 steps)
  Amplitude ratio: -3 ±1 dB (At cutoff point)
  Attenuation: (-12±1) dB/oct.

Antialiasing LPF (DPM-42B-F, DPM-42B-I-F)
  8th Butterworth type
  Cutoff frequencies: Automatic setting at ×0.25 sampling frequency
  Attenuation: -48 ±5 dB (When ×0.5 sampling frequency)
  Note: Enabled when "AUTO" set in DCS-100A LPF settings

Resolution 16 bits

Check Functions Input resistance into one side of the bridge,
  and check input

TEDS Reads information from TEDS-installed sensors

Monitor Output Accuracy: Within ±5 V ±0.5% (At ±FS),
  Nonlinearity: Within 0.5% FS

Withstand Voltage Between input and output: 250 VAC, 1 min.

EMC Directive EN61326-1 (Class A)

| Optional Accessories | Monitor output cable U-64 (2 m) |

Note: If the transducer with a remote-sensing function, a 4-conductor extension cable (N-81 (5 m) to N-85 (50 m)) enables measurement. But the remote-sensing function will be ineffective.

■Thermocouple Card CTA-40A

This card measures temperatures using 2 types of thermocouples K (CA) and T (CC). It is isolated between input and output, and between channels.

Measuring Targets Thermocouples of K, T

Channels 8

Thermocouple Resistance 200 Ω or less (Burnout ON)
  1000 Ω or less (Burnout OFF)

Measuring Range K1230, K480, K240, T400, T210 and OFF – 6 steps

Range names	Measuring Range
K1230	-200 to 1230 °C
K480	-200 to 480 °C
K240	-200 to 240 °C
T400	-200 to 400 °C
T210	-200 to 210 °C

General Accuracy Within ±(0.5% of reading+1)°C (At ambient temp. 20±3°C)
  Within ±(0.5% of reading+2)°C (At ambient temp. 0 to 40°C)

Calibration (CAL) Output at 100% and 50% and 0°C as absolute
  value of each range

Frequency Response DC to 10 Hz

Resolution 16 bits

Burnout Built-in: At burnout [Burnout display], with ON/OFF
  Note: If high thermocouple resistance, turn the burnout
  function OFF to improve accuracy

Monitor Output Accuracy: Within 5 V ±0.5% (At +FS)
  Nonlinearity: Within ±0.5%FS

Isolation Between input and output, and between channels:
  50 MΩ or more (500 VDC)

EMC Directive EN61326-1 (Class A)

| Standard Accessories | 8 channel input cable U-104 (1 m) |
| | Temperature measuring adapter CT-2A ×8 |

| Optional Accessories | Integrated output cable U-62 (1.1 m) |

■F/V Converter Card CFV-40A

This card measures the frequency of pules, and provide power supply to the sensors. It is isolated between input and output.

Measuring Targets Alternating signal output sensors

Channels 4

Input Signals AC (Zero cross),
  TTL level (Including open collector signals)

Input Voltage ±(0.5 V to 50 V): High hysteresis
  ±(0.1 V to 50 V): Low hysteresis

Measuring Range 50, 100, 500, 1 k, 2 k, 5 k, 10 k, 20 kHz and
  OFF — 9 steps
  Accuracy: Within ±0.1%FS

Calibration (CAL) Output at 100%, 50% (added),
  and 0% (Absolute value) of each range

Response Time Within 10 μs (Continuous pules input)
  within (2 cycles of input pules + 50 μs)
  (Input pules are broken)

Resolution 16 bits

Sensor Power supply 12 VDC: Within 10% (Each channel 50 mA or less)

Monitor Output Accuracy: Within 5 V ±0.5% (At +FS)
  Nonlinearity: Within ±0.1%FS

Isolation Between input and output, and between channels:
  50 MΩ or more (500 VDC)

| Standard Accessories | Conversion adapter FV-1A x4 |

| Optional Accessories | Input cable U-12 (1.5 m), U-13 (1.5 m) |
| | Monitor output cable U-64 (2 m) |

■Charge Amplifier Card CCA-40A, CCA-40A-F

This card measures acceleration using piezoelectric accelerometers. (Type with antialiasing LPF is CCA-40A-F).

Measuring Targets Piezoelectric accelerometers

Applied Accelerometers Built-in amplifier (Voltage output) type

Channels 8

Power Supply to Sensors Constant current power (Current: 4 mA,
  excitation voltage: Approx. 24 VDC,
  load 1 kΩ or less)

Frequency Response 1 to 20 kHz (Deviation: +1dB, -3dB)

Measuring Range 20, 50, 100, 200, 500, 1000, 2000, 5000 mV
  and OFF—9 steps
  Accuracy: Within ±1%FS

Calibration DC CAL
  ±100% and ±50% of each range
  Accuracy: Within ±0.2%FS
  AC CAL
  100% and 50% of each range
  Accuracy: Within ±1%FS
  Frequency accuracy: Within 100 Hz±5%

LPF Transfer characteristic: 2nd order Butterworth
  Cutoff frequencies: 300, 1 k, 3 k, 10 k Hz and FLAT (5 steps)
  Amplitude ratio: -3 ±1 dB (At cutoff point)
  Attenuation: (-12±1) dB/oct.

Antialiasing LPF (Only applicable to CCA-40A-F)
  8 Butterworth type
  Cutoff frequencies: Automatic setting at ×0.25 sampling frequency
  Attenuation: -48±5dB (When ×0.5 sampling frequency)

Distortion Factor 1% or less

Resolution 16 bits

Monitor Output Accuracy: Within 5 V ±1% (At +FS)

TEDS Reads information from TEDS-installed sensors

EMC Directive EN61326-1 (Class A)

| Standard Accessories | Input cable U-111 (1 m) |

| Optional Accessories |

  Integrated output cable U-62 (1.1 m),
  Input cable U-109 (1 m)
  Conversion adapter (BNC-miniature) BNCP-C25J-A
  Conversion adapter (Miniature-Tajimi) CCA-1B
  Conversion adapter (BNC-miniature) CCA-2B

■CAN Card CAN-41A

This card measures data frames on the Controller Area Network. The dual input CAN-41A collects data frames for 2 systems of different communications systems as analog data at the same time.

CAN Board Numbers	CAN-41A: 2 (2 nodes)
Connector Configuration	D-sub 9 pin (male)
Supported CAN Version	Bosch2.0B active support
	(ISO-11898 specifications-compliant)
	High-speed CAN/low-speed CAN switching
Measurement ID Numbers	CAN-41A: Max. 32
CAN Controller Operation Clock	40 MHz, 32 MHz

Baud Rate With high-speed CAN

 1000, 800, 500, 250, 125, 100, 83.3, 62.5, 50, 33.3, 25, 20, and 10 kbps

 With low-speed CAN

 125, 100, 83.3, 62.5, 50, 33.3, 25, 20, and 10 kbps

Communications Conditions Sample points, sampling frequency, resynchronization jump width selection.

Measuring channel conditions

 Start bit, bit length, data type, Calibration coefficient

 (Conditions for conversion of extracting CAN data to physical quantity)

Graph display Simultaneous display of graph, numerical value, frame, and analog data

Others Only one card is mounted in the last slot of the EDX.

 When measuring CAN data, the sampling frequency

 is restricted to

 EDX-5000A: 10 kHz

 EDX-200A: 2048 Hz

 EDX-100A: 1 kHz

EMC Directive EN61326-1 (Class A)

Standard Accessories   Integrated output cable U-62 (1.1 m)

■A/D Converter Card AD-40AS, AD-40AS-F

AD-40AS is an 8-channel voltage input card. (AD-40AS-F equipped with antialiasing LPF is also available.)

Channels	8
Input Range	±5 V, ±10 V and OFF
Input Modes	Unbalanced (Not balanced differential)
Input Resistance	Approx. 1 MΩ
Sampling Methods	All channels in sync
A/D Converter	Methods: Successive approximation
	Resolution: 16 bits (± 32000 counts/FS)
	Accuracy: Within ±0.2%FS
Nonlinearity	Within ±0.1%FS
Input Frequencies	Range: DC to 50 kHz
	Deviation: 1dB to -3dB

LPF Transfer characteristic: 2nd order Butterworth

 Cutoff frequencies: 10, 30, 100, 300, 1 k, 3 k, 10 k Hz and FLAT (8 steps)

 Amplitude ratio: -3 ±1 dB (At cutoff point)

 Attenuation: (-12 ±1) dB/oct.

Antialiasing LPF (AD-40AS-F only)

 Transfer Characteristic: 8th order Butterworth

 Cutoff frequencies: A quarter of sampling frequency (auto setting) *

 Attenuation: (-48 ± 5) dB/oct.

 *(Set LPF to [AUTO])

Power Supply to Sensors ±2.5 V ± 1%, each channel

TEDS Reads information from TEDS-installed sensors

Optional Accessories   8-channel input cable: U-127 (1.5 m)
 Voltage input box: VI-8A with a cable N-121 (1.5 m)