Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

FLEX I/O-XT Digital DC Input/Output Modules

Catalog Numbers 1794-IB10XOB6XT, 1794-IB16XT, 1794-OB8EPXT, 1794-OB16PXT

Modules with an XT in the last position of the catalog number are conformally coated to meet noxious gas requirements of ISA/ANSI-71.040-1985 Class G3 Environment.

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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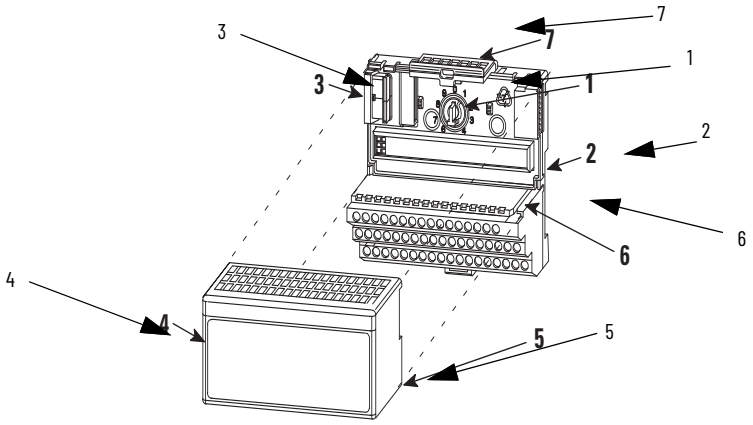
Rockwell Automation

Overview

The FLEX I/O-XT™ digital DC input/output module mounts on a FLEX™ I/O terminal base.



	Description		Description
1	Keyswitch	5	Alignment bar
2	Terminal base	6	Groove
3	Flexbus connector	7	Latching mechanism
4	Module		

Install Your Module

ATTENTION: During mounting of all devices, be sure that all debris (for example, metal chips and wire strands) is kept from falling into the module. Debris that falls into the module could cause damage on power-up.

1. Rotate the keyswitch (1) on the terminal base (2) clockwise to position 2 as required for this type of module.
2. Make certain the Flexbus connector (3) is pushed all the way to the left to connect with the adjacent terminal base/adapter. **You cannot install the module unless the connector is fully extended.**
3. Make sure the pins on the bottom of the module are straight so that they align properly with the connector in the terminal base.
4. Position the module (4) with its alignment bar (5) aligned with the groove (6) on the terminal base.
5. Press firmly and evenly to seat the module in the terminal base unit. The module is seated when the latching mechanism (7) is locked into the module.

Connect Wiring for the 1794-OB8EPXT, 1794-OB16PXT, and 1794-IB10XOB6XT Modules

1. Connect individual output wiring to numbered terminals on the 0…15 row as indicated in Table 1, Table 2, and Table 4 (1794-OB16P – Terminals 0…15; 1794-OB8EPXT– Even numbered terminals 0…14).
2. Connect the associated -V output common to the corresponding terminal on the 16…33 row (B) for each output as indicated in the accompanying table. Commons are internally connected together.

   For 1794-OB8EPXT, connect associated output common to odd-numbered terminals on row A or associated terminals on row B.

   For 1794-IB10XOB6XT, connect the associated +V DC power lead of the input device to the corresponding terminal on the 34…51 row (C) for each input as indicated in Table 4. The +V power terminals of row (C) are internally connected together.

   For 1794-IB10XOB6XT, connect the associated input device common (3-wire devices only) and output device common to the corresponding terminals on the 16…33 row (B) for each input and output as indicated in Table 4. Commons are internally connected together.
3. Connect +V DC power to terminal 34 on the 34…51 row (C).
4. Connect -V DC common to terminal 16 on the 16…33 row (B).
5. If daisy chaining power to the next terminal base, connect a jumper from terminal 51 (+V DC) on this base unit to terminal 34 on the next base unit.
6. If continuing -V DC common to the next base unit, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit.

Connect Wiring for the 1794-IB16XT Module

1. Connect individual input wiring to numbered terminals on the 0…15 row (A) as indicated in Table 3.
2. Connect the associated +V DC power lead of the input device to the corresponding terminal on the 34…51 row (C) for each input as indicated in Table 3. The +V power terminals of row (C) are internally connected together.
3. Connect the associated input common (3-wire devices only) to the corresponding terminal on the 16…33 row (B) for each input as indicated in Table 3. Commons are internally connected together.
4. Connect +V DC power to terminal 34 on the 34…51 row (C).
5. Connect DC common to terminal 16 on the 16…33 row (B).
6. If daisy chaining power to the next terminal base, connect a jumper from terminal 51 (+V DC) on this base unit to terminal 34 on the next base unit.
7. If continuing DC common to the next base unit, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit.

Table 1 - Wiring Connections for the 1794-OB16PXT (with 1794-TB2, 1794-TB3, or 1794-TB3S)

Output	Output Terminal	Common Terminal
Output 0	A-0	B-17
Output 1	A-1	B-18
Output 2	A-2	B-19
Output 3	A-3	B-20
Output 4	A-4	B-21
Output 5	A-5	B-22
Output 6	A-6	B-23
Output 7	A-7	B-24
Output 8	A-8	B-25
Output 9	A-9	B-26
Output 10	A-10	B-27
Output 11	A-11	B-28
Output 12	A-12	B-29
Output 13	A-13	B-30
Output 14	A-14	B-31
Output 15	A-15	B-32
+V DC	C-34…C-51 (C-34 and C-51 for 1794-TB2)	
Common	B-16…B-33	

Table 2 - Wiring Connections for the 1794-OB8EPXT

Output	1794-TB2, 1794-TB3, 1794-TB3S		1794-TBN	
	Output Terminal	Common Terminal[1]	Output Terminal	Common Terminal[2]
Output 0	A-0	A-1/B-17	B-0	C-1
Output 1	A-2	A-3/B-18	B-2	C-3
Output 2	A-4	A-5/B-19	B-4	C-5
Output 3	A-6	A-7/B-20	B-6	C-7
Output 4	A-8	A-9/B-21	B-8	C-9
Output 5	A-10	A-11/B-22	B-10	C-11
Output 6	A-12	A-13/B-23	B-12	C-13
Output 7	A-14	A-15/B-24	B-14	C-15
+V DC	C-34…C-51 (C-34 and C-51 for 1794-TB2, 1794-TBN)			
Common	B-16…B-33 (B-16 and B-33 for 1794-TBN)			

(1) 1794-TB2, 1794-TB3, 1794-TB3S - A-1, A-3, A-5, A-7, A-9, A-11, A-13, and A-15 are connected together inside the module to 24V DC common.
(2) 1794-TBN - C-1, C-3, C-5, C-7, C-9, C-11, C-13, and C-15 are connected together inside the module to 24V DC common.

Table 3 - Wiring Connections for the 1794-IB16XT (with 1794-TB3 or 1794-TB3S)

Input	Input Terminal	Voltage Terminal	Common Terminal[1]
Input 0	A-0	C-35	B-17
Input 1	A-1	C-36	B-18
Input 2	A-2	C-37	B-19
Input 3	A-3	C-38	B-20
Input 4	A-4	C-39	B-21
Input 5	A-5	C-40	B-22
Input 6	A-6	C-41	B-23
Input 7	A-7	C-42	B-24
Input 8	A-8	C-43	B-25
Input 9	A-9	C-44	B-26
Input 10	A-10	C-45	B-27
Input 11	A-11	C-46	B-28
Input 12	A-12	C-47	B-29
Input 13	A-13	C-48	B-30
Input 14	A-14	C-49	B-31
Input 15	A-15	C-50	B-32
+V DC	C-34…C-51		
Common	B-16…B-33		

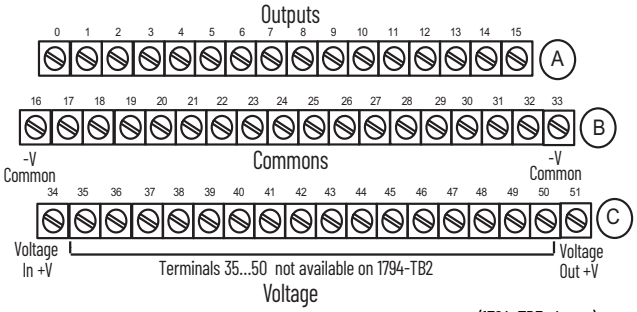
(1) For 3-wire devices use input, supply and common. For 2-wire devices use input and supply.

Table 4 - Wiring Connections for 1794-IB10XOB6XT

Input[1]	Signal	Return	Supply
Sink Input			
Input 0	A-0	B-17	C-35
Input 1	A-1	B-18	C-36
Input 2	A-2	B-19	C-37
Input 3	A-3	B-20	C-38
Input 4	A-4	B-21	C-39
Input 5	A-5	B-22	C-40
Input 6	A-6	B-23	C-41
Input 7	A-7	B-24	C-42
Input 8	A-8	B-25	C-43
Input 9	A-9	B-26	C-44
Source Output			
Output 0	A-10	B-27	
Output 1	A-11	B-28	
Output 2	A-12	B-29	
Output 3	A-13	B-30	
Output 4	A-14	B-31	
Output 5	A-15	B-32	
+V DC	C-34...C-51 (internally connected together)		
Common	B-16...B-33 (internally connected together)		

(1) For 2-wire input devices use signal and supply terminals. For 3-wire devices use signal, return and supply terminals.

1794-TB2, 1794-TB3, and 1794-TB3S Terminal Base Wiring for the 1794-OB8EPXT and 1794-OB16PXT

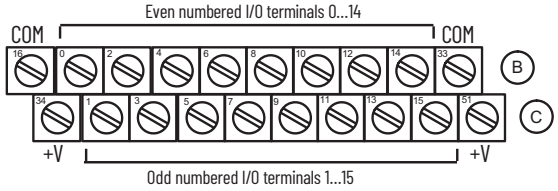


(1794-TB3 shown)

Connect -V (Supply Common) to terminal B-16.
Connect +V (Supply +Voltage) to terminal C-34.
Use B-33 and C-51 for daisy chaining to next terminal base unit.

Total current draw through the terminal base is limited to 10 A.
Separate power connections to each terminal base may be necessary.

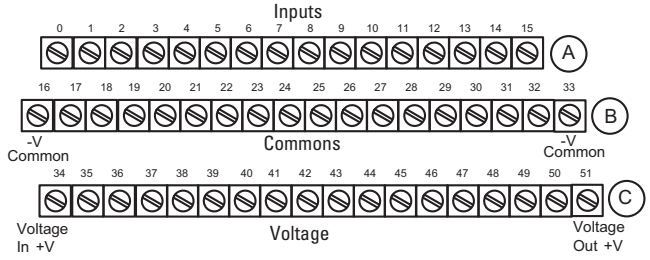
1794-TBN Terminal Base Wiring for the 1794-OB8EPXT



Connect -V (Supply Common) to terminal B-16.
Connect +V (Supply +Voltage) to terminal C-34.
Use B-33 and C-51 for daisy chaining to next terminal base unit.

Total current draw through the terminal base is limited to 10 A.
Separate power connections to each terminal base may be necessary.

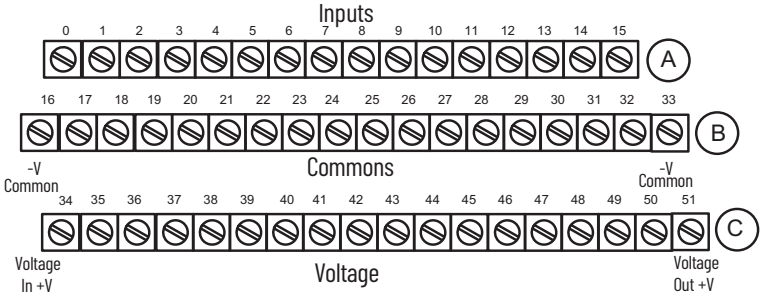
1794-TB3 and 1794-TB3S Terminal Base Wiring for the 1794-IB16XT



(1794-TB3 shown)

Connect -V (Supply Common) to terminal B-16.
Connect +V (Supply +Voltage) to terminal C-34.
Use B-33 and C-51 for daisy chaining to next terminal base unit.

1794-TB3 and 1794-TB3S Terminal Base Wiring for the 1794-IB10X0B6XT

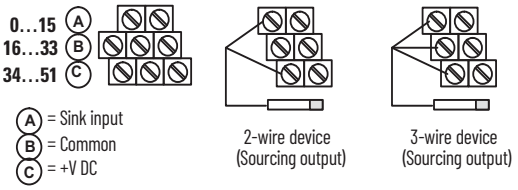


Connect V common to terminals B-16
Connect +V to terminal C-34

(1794-TB3 shown)

-V (Supply Common) = Terminals B-16 and B-33
+V (Supply +Voltage) = Terminals C-34 and C-51
Use B-33 and C-51 for daisy chaining to next terminal base unit.

2-wire and 3-wire Input Wiring for the 1794-IB16XT and 1794-IB10X0B6XT



Configure Your Module

Configure your output/input module by setting bits in the configuration word.

Configuration

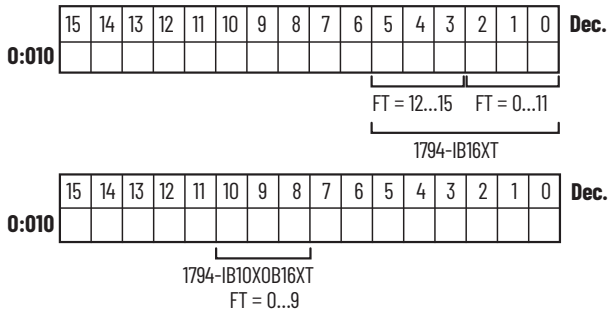
Dec.	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Oct.	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1794-OB8EPXT																
Read	F7	F6	F5	F4	F3	F2	F1	F0	Reserved[1]							
Write	Not used							FR	07	06	05	04	03	02	01	00
Write	Not used															
1794-OB16PXT																
Read	Not used															
Write	015	014	013	012	011	010	09	08	07	06	05	04	03	02	01	00
Write 1794-OB32P only	031	030	029	028	027	026	025	024	023	022	021	020	019	018	017	016
1794-IB16XT																
Read 1	I15	I14	I13	I12	I11	I10	I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
Read 2	C = Counter input value of input 15[2]															
Write 1	Not used		CF[2]	CR[2]	Not used						Input Filter 12…15			Input Filter 0…11		
1794-IB10X0B6XT																
Read 1	Not used						I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
Write 2	Not used										05	04	03	02	01	00
Write 3	Not used					FT			Not used							
Where:	O = Output - 00 corresponds to output 0, 01 corresponds to output 1 F = Overload fault bits - 1 = Fault present; 0 = No fault FR = Fault reset bit - 1 = Reset output; 0 = No change I = Input C = Counter value for input 15 CR = Counter reset CF = Counter fast - Where 1 = Fast input (raw data); 0 = Standard input filtered data FT = Input filter time for input channels 1794-OB16PXT uses outputs 0…3.															

(1) The unused lower byte in read word 1 floats during operation. Do not use this byte for fault status. See Program the 1794-OB8EPXT on page 10.
(2) C, CR, and CF are not available when used with any series 1794-ASB or 1794-ASB2 remote I/O adapter module.

Set the Input Filter Time (1794-IB16XT and 1794-IB10XOB6XT)

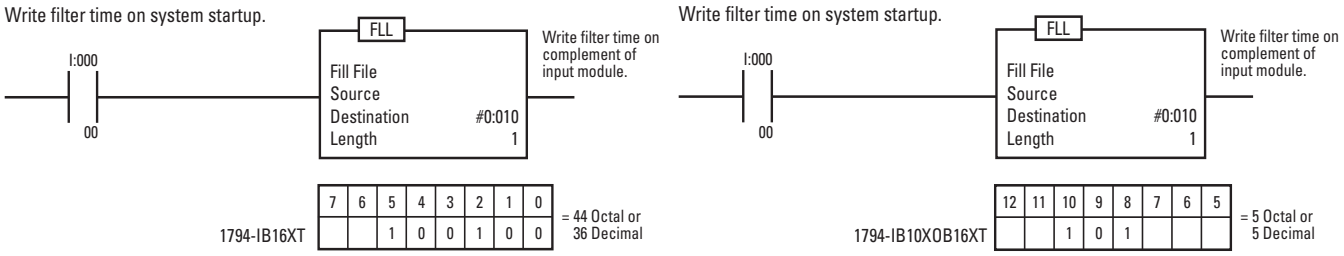
IMPORTANT

To set the input filter time, set the associated bits in the output image table (complementary word) for the module.



As an example for 1794-IB16XT, to increase the Off-to-On filter time to 4 ms for all inputs at address rack 1, module group 0, set bits and program as shown in Figure 1. For 1794-IB10XOB6XT, increase the Off-to-On filter time to 8 ms for all inputs at address rack 1, module group 0, in configuration word 3, by setting bits as shown.

Figure 1 - Write Filter Time on System Startup



See Table 5 and Table 6 for other bit settings.

Table 5 - Input Filter Time (1794-IB16XT)

Bits			Description - Filter Time	Filter Time
02	**01**	**00**	**Inputs 0...11**	**1794-IB16XT**
05	**04**	**03**	**Inputs 12...15**	
0	0	0	Filter time 0 (default)	0.25 ms
0	0	1	Filter time 1	0.5 ms
0	1	0	Filter time 2	1 ms
0	1	1	Filter time 3	2 ms
1	0	0	Filter time 4	4 ms
1	0	1	Filter time 5	8 ms
1	1	0	Filter time 6	16 ms
1	1	1	Filter time 7	32 ms

Table 6 - Input Filter Time (1794-IB10XOB6XT)

Bits			Description	
10	**09**	**08**	**Filter Time for Inputs**	**Off-to-On/On-to-Off**
0	0	0	Filter time 0	0.25 ms
0	0	1	Filter time 1	0.5 ms
0	1	0	Filter time 2	1.0 ms
0	1	1	Filter time 3	2.0 ms
1	0	0	Filter time 4	4.0 ms
1	0	1	Filter time 5	8.0 ms
1	1	0	Filter time 6	16.0 ms
1	1	1	Filter time 7	32.0 ms

Specifications

Output Modules

Attribute	1794-OB8EPXT	1794-OB16PXT	1794-IB10XOB6XT
Number of outputs, non-isolated, sourcing	8 (1 group of 8)	16	6
Module location	1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBN	1794-TB2, 1794-TB3, 1794-TB3S	
On-state current	1.0 mA min, per channel 2.0 A max, per channel	1.0 mA min, per channel 500 mA max, per channel	2.0 A max, per channel
On-state voltage range, min	19.2V DC	10V DC	10V DC
On-state voltage range, nom	24V DC	24V DC	24V DC
On-state voltage range, max	31.2V DC	31.2V DC	31.2V DC
Supply voltage, nom	24V DC		
Voltage range	19.2…31.2V DC	10…31.2V DC	10…31.2V DC (includes 5% AC ripple)
Supply current	55 mA @ 24V DC	35 mA @ 24V DC	15 mA @ 19.2V DC 19 mA @ 24V DC 8 mA @ 10V DC 25 mA @ 31.2V DC
Output current rating	2.0 A max, per output 10.0 A max, per module (for example, 8 outputs @ 1.25 A, 5 outputs @ 2.0 A, or similar combinations totaling 10.0 A or less)	8.0 A (16 outputs @ 0.5A)	2.0 A per output 10.0 A max, per module
Surge current	4.0 A for 10 ms, repeatable every 3 s	1.5 A for 50 ms, repeatable every 2 s	4.0 A for 50 ms, repeatable every 2 s
Off-state leakage, max	0.5 mA		
On-state voltage drop, max	0.2V DC	0.5V DC	1.0V DC @ 2 A, 0.5V DC @ 1 A
Isolation voltage	50V (continuous), Basic Insulation Type No isolation between individual channels Type tested at 1500V AC for 60 s, between field side and system	50V (continuous), Basic Insulation Type No isolation between individual channels Type tested at 2550V DC for 60 s, between field side and system	50V (continuous), Basic Insulation Type No isolation between individual channels Type tested at 1365V AC for 60 s, between field side and system
Output signal delay, max Off-to-On On-to-Off	 0.5 ms 1.0 ms		
Flexbus current	80 mA	60 mA	50 mA
Power dissipation, max	5 W @ 31.2V DC	5.0 W @ 31.2V DC	6.0 W @ 31.2V DC
Thermal dissipation, max	17.1 BTU/hr @ 31.2V DC	17.0 BTU/hr @ 31.2V DC	20.3 BTU/hr @ 31.2V DC
Indicators (field side indication, logic driven)	8 yellow status indicators 8 red fault indicators	16 yellow status indicators	6 yellow status indicators
Fusing	Outputs are electronically fused	Outputs are electronically protected	Module outputs are not fused. (1)

(1) Fusing is recommended. If fusing is desired, you must supply external fusing. Use SAN-O M04-3A or Littelfuse 235-003 fuses.

Input Modules

Attribute	1794-IB10XOB6XT	1794-IB16XT
Number of inputs	10, nonisolated, sinking	16 (1 group of 16), nonisolated, sinking
Module location	1794-TB2, 1794-TB3, 1794-TB3S	1794-TB3, 1794-TB3S Terminal Base Unit
On-state current, min	2.0 mA	2.0 mA
On-state current, nom	8.0 mA @ 24V DC	3.0 mA @ 24V DC
On-state current, max	11.0 mA	4.0 mA
On-state voltage range, min	10V DC	
On-state voltage range, nom	24V DC	
On-state voltage range, max	31.2V DC	
Supply voltage, nom	24V DC	24V DC
Voltage range	10…31.2V DC (includes 5% AC ripple)	10…31.2V DC
Supply current	15 mA @ 19.2V DC 19 mA @ 24V DC 8 mA @ 10V DC 25 mA @ 31.2V DC	50 mA @ 24V DC
Off-state voltage, max	5.0V DC	
Off-state current, min	1.5 mA	
Input impedance	4.8 kΩ	
Isolation voltage	50V (continuous), Basic Insulation Type No isolation between individual channels Type tested at 1365V AC for 60 s, between field side and system	50V (continuous), Basic Insulation Type No isolation between individual channels Type tested at 850V AC for 60 s, between field side and system
Flexbus current	50 mA	30 mA

Input Modules (Continued)

Attribute	1794-IB10XOB6XT	1794-IB16XT
Power dissipation, max	6.0 W @ 31.2V DC	2 W @ 31.2V DC
Thermal dissipation, max	20.3 BTU/hr @ 31.2V DC	9.2 BTU/hr @ 31.2V DC
Status indicators	10 yellow status indicators (Logix side indication, logic driven)	16 yellow status indicators (Field side indication, logic driven)

General Specifications

Attribute	Value
Terminal base screw torque	Determined by the installed terminal base
Input filter time	See the Input Filter Time settings in Table 5 and Table 6.
Wire size	Determined by the installed terminal base
Wiring category(1)	2 - on signal ports
Dimensions (with module installed), (H x W x D)	94 x 94 x 69 mm 3.7 x 3.7 x 2.7 in.
Enclosure type rating	None (open-style)
Keyswitch position	2
Pilot duty rating	2 A (1794-OB16PXT, 1794-IB10XOB6XT, 1794-OB8EPXT)
North American temp code	T4A T4 (1794-OB8EPXT, 1794-IB10XOB6XT)
IECEx temp code	T4
UKEX/ATEX temp code	T4

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications

Attribute	Value
Operating temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...+70 °C (-4...+158 °F)
Temperature, surrounding air, max	70 °C (158 °F)
Storage temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40...+85 °C (–40...+185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock, operating	IEC60068-2-27 (Test Ea, Unpackaged shock): 30 g
Shock, nonoperating	IEC60068-2-27 (Test Ea, Unpackaged shock): 50 g
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...6000 MHz
EFT/B immunity	IEC 61000-4-4: ±2kV @ 5kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz

Certifications

Attribute (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
UK and CE	UK Statutory Instrument 2016 No. 1091 and European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers EN 61000-6-4; Industrial Emissions UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with: EN 63000; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with: EN IEC 60079-0; General Requirements EN IEC 60079-7; Explosive Atmospheres, Protection "e" II 3 G Ex ec IIC T4 Gc DEMKO 14 ATEX 1342501X UL22UKEX2378X
TÜV	TÜV Certified for Functional Safety: up to and including SIL 2
IECEx	IECEx System, compliant with: IEC 60079-0; General Requirements IEC 60079-7; Explosive Atmospheres, Protection "e" Ex ec IIC T4 Gc IECEx UL 14.0066X
CCC	CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products
Morocco	Arrêté ministériel n° 6404-15 du 29 ramadan 1436
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) See the Product Certification link at rok.auto/certifications for Declaration of Conformity, Certificates, and other certification details.

Additional Resources

For more information on the products that are described in this publication, use these resources. You can view or download publications at rok.auto/literature.

Resource	Description
FLEX I/O and FLEX I/O-XT Selection Guide, publication 1794-SG002	Provides information on how to select FLEX I/O and FLEX I/O-XT adapters, terminal bases, I/O modules, and accessories.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.