Technical Data

Original Instructions

ControlLogix I/O Modules Specifications

Bulletin 1756

The ControlLogix® Architecture provides a wide range of input and output modules to span many applications, from high-speed digital to process control. The ControlLogix architecture uses Producer/Consumer technology, which allows input information and output status to be shared among multiple ControlLogix controllers.

Summary of Changes

This publication contains new and updated information as indicated in the following table.

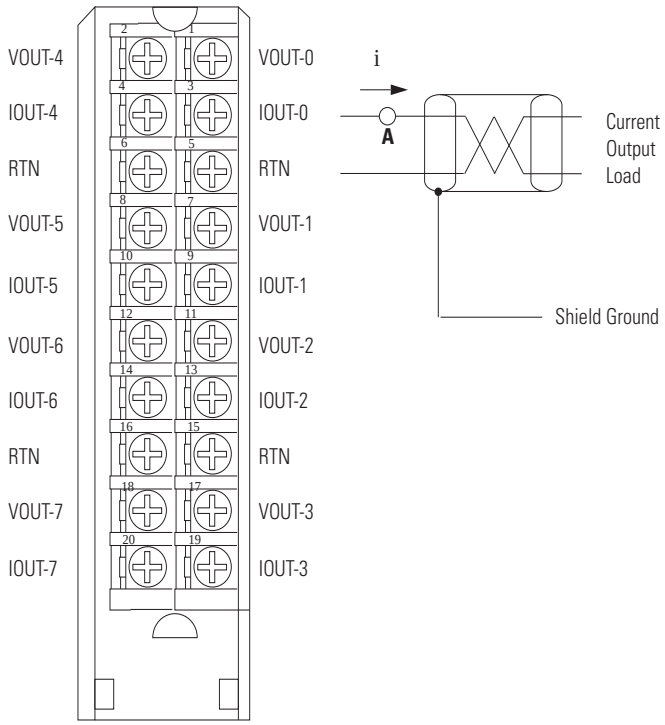
Topic	Page
Updated Technical Specifications for Series C 1756-OF4 and 1756-OF4K modules	176
Updated Technical Specifications for Series C 1756-OF8 and 1756-OF8K modules	180

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

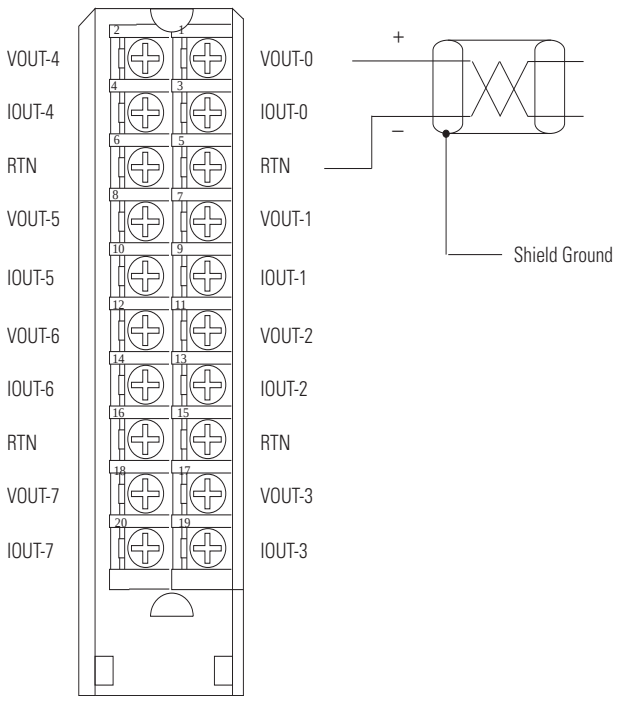
1756-OF8, 1756-OF8K

ControlLogix voltage/current output analog module

1756-OF8, 1756-OF8K Current



1756-OF8, 1756-OF8K Voltage



- Place additional loop devices (such as strip chart recorders) at the A location noted in the drawing.
- All terminals marked RTN are connected internally.

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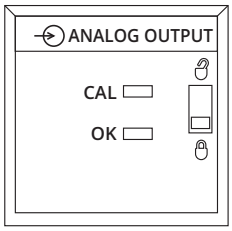
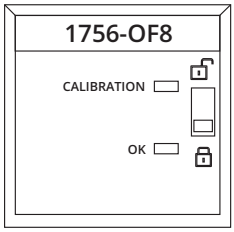
Series A



Series B and C



Signal and User Counts

Range	Low Signal and User Counts	High Signal and User Counts
0...20 mA	0 mA -32,768 counts	21.2916 mA 32,767 counts
±10V	-10.4336V -32,768 counts	10.4336V 32,767 counts

Technical Specifications

Attribute	1756-OF8/A, 1756-OF8K/A	1756-OF8/B, 1756-OF8K/B, 1756-OF8/C, 1756-OF8K/C
Outputs	Eight voltages or current	
Output range	± 10V 0...20 mA	
Resolution	Voltage: 15 bits across 10.5V - 320 µV/bit Current: 16 bits across 21 mA - 325 nA/bit	
Current draw @ 5.1V	150 mA	200 mA
Current draw @ 24V	210 mA	300 mA

Technical Specifications (Continued)

Attribute	1756-OF8/A, 1756-OF8K/A	1756-OF8/B, 1756-OF8K/B, 1756-OF8/C, 1756-OF8K/C
Total backplane power	5.8 W	8.22 W
Voltage and current ratings	Backplane: 5.1V DC, 150 mA max; 24V DC, 210 mA max Output Voltage: -10...+10V Output Current: 0...20mA	Backplane: 5.1V DC, 200 mA max; 24V DC, 300 mA max Output Voltage: -10...+10V Output Current: 0...20mA
Power dissipation	5.8 W; 0...750 ohm loads	8.22...2 W; 0...750 ohm loads
Thermal dissipation	16.78 BTU/hr	28.03 BTU/hr
Open circuit detection	Current output only (Output must be set to >0.1 mA)	
Overvoltage protection	24V DC	± 24V DC
Short circuit protection	Electronically current limited to 21 mA or less	
Drive capability	Voltage: > 2000 Ω Current: 0...750 Ω	
Settling time	< 2 ms to 95% of final value with resistive loads	
Calibrated accuracy @ 25 °C (77 °F)	Better than 0.05% of range from 0...21 mA, -10.4...10.4V	
Calibration interval	12 months typical	N/A
Offset drift	50 µV/ °C 100 nA/°C	20 µV/ °C 80 nA/°C
Gain drift with temperature, max	Voltage: 25 ppm/°C, 520 µV/°C Current: 50 ppm/°C, 1050 µA/°C	Voltage: 6 ppm/°C, 125 µV/°C Current: 30 ppm/°C, 630 µA/°C
Module error	Voltage: 0.15% of range Current: 0.3% of range	Voltage: 0.1% of range Current: 0.2% of range
Module scan time, min	12 ms floating point 8 ms integer	
Data format	Integer mode (left justified, 2 s complement) IEEE 32-bit floating point	
Module conversion method	R-Ladder DAC, monotonicity with no missing codes	
Isolation voltage	250V (continuous), Reinforced insulation type, Output Channels to Backplane No isolation between individual Output Channels	250V (continuous), Basic(1) insulation type, Output Channels to Backplane No isolation between individual output channels Compliant and tested according to IEC/UL 61010-1
Module keying	Electronic, software configurable	
Removable terminal block	1756-TBNH 1756-TBSH	
RTB keying	User-defined mechanical	
Slot width	1	
Wire size	1756-TBNH Single wire connection: 0.33...2.1 mm^2 (22...14 AWG) solid or stranded copper wire, rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max. Do not wire more than one conductor on any terminal. Double wire connection: 0.33...1.3 mm^2 (22...16 AWG) solid or stranded copper wire, rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max. Do not wire more than two conductors on any terminal 1756-TBSH Single wire connection, 0.33...2.1 mm^2 (22...14 AWG) solid, or stranded shielded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation max. Do not wire multiple conductors on any terminal	
Terminal block torque specs	1756-TBNH: 1.36 N•m (12 lb•in)	
Wiring category(2)	1 - on signal ports	
Enclosure type	None (open-style)	
Temperature code	T4	

(1) Series A modules were specified to Reinforced Insulation based on UL508 terminology. Series B and series C modules are type tested to the same Dielectric strength voltage as series A modules but use updated terminology based on IEC 61010-1, Basic Insulation.
(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications

Attribute	1756-OF8/A, 1756-OF8K/A	1756-OF8/B, 1756-OF8K/B, 1756-OF8/C, 1756-OF8K/C
Temperature, operating IEC 60068-2-1 (Test Ae, Operating Cold), IEC 60068-2-2 (Test Be, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)	Chassis Series C 0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F) Chassis Series B 0 °C ≤ Ta ≤ +55 °C (+32 °F ≤ Ta ≤ +131 °F)
Temperature, surrounding air, max	60 °C (140 °F)	Series C Chassis: 60 °C (140 °F) Series B Chassis: 55 °C (131 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g	30 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...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz	10V/m with 1 kHz sine wave 80% AM from 80...6000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz
EFT/B immunity IEC 61000-4-4	±4 kV at 5/100 kHz 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...100 MHz	

Certifications

Certification (when product is marked)[1]	1756-OF8/A, 1756-OF8K/A	1756-OF8/B, 1756-OF8K/B, 1756-OF8/C, 1756-OF8K/C
cULus	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.	
FM	FM Approved Equipment for use in Class I Division 2 Group A, B, C, D Hazardous Locations	
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)	
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions	
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMK015ATEX1482X	European Union 2014/34/EU ATEX Directive, compliant with: • EN IEC 60079-0; General Requirements • EN IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • UL 22 ATEX 2772X

Certifications (Continued)

Certification (when product is marked)(1)	1756-OF8/A, 1756-OF8K/A	1756-OF8/B, 1756-OF8K/B, 1756-OF8/C, 1756-OF8K/C
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0053X	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • IECEx UL 22.0039X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3	
UKex	N/A	In conformity with the following UKex Statutory Instruments and their amendments: • Schedule 1 of the UKEX Regulation 2016 No. 1107 • Equipment protection by increased safety "e", reference certificate number UL22UKEX2499X • Zone 2 classification according to UKEX Regulation 2016 No. 1107
UKCA	N/A	In conformity with the following UK Statutory Instruments and their amendments: • 2016 No. 1091, Electromagnetic Compatibility Regulations • 2016 No. 1101, Electrical Equipment (Safety) Regulations • 2016 No. 1107, Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations • 2012 No. 3032, Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment
Morocco	N/A	In conformity with the following regulations: • Arrêté ministériel n° 6404-15 du 1 er muharram 1437 (15 octobre 2015) Équipements électriques destinés à être utilisés sous certaines limites de tension • Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) Compatibilité électromagnétique des équipements
CCC	N/A	CCC 2020122309111830, 2020122309111998, 2020122309113868 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

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