

TR-1077 S-Band 850 KW Transmitter Specifications

Magnetron: S-Band VMS-1197
Frequency: 2.7-2.9 GHz
Duty: .001
Magnetron Input: 36KV, 50 Amps
Peak Power: 850 KW

:Pulse Widths (Measured at -3db of the RF pulse) Adjustable:

A. 0.5 μ sec
B. 0.8 μ sec
C: 1.0 μ sec
D: 2.0 μ sec
Rise time: 60 nsec
Fall time: 200 nsec
Pulse Jitter: 5 nsec Max.

Output Requirements:

Stability: 0.1 dB, Pulse to Pulse
Spectrum: 12 dB, down on side bands

Modulator Output:

Output Voltage Pulse Adjustable Between 0 to -38 KV Pulse
Filament Voltage: -9.0 VDC at 24 ADC
Input Trigger: 5.0 VPK 2.0 μ sec

Environmental Specifications

Altitude: 10,000 feet
Ambient Temperature: -40° C TO +50° C
Humidity: 95%
Cooling: Internal, Forced Air

Component Dimensions & Weight:

Modulator: 19.1" Width, 21.6" Length, 12" Max. Height
Max. Weight: 140 Lbs
Power Supply: 17.50" Width, 22.3 Length, 8.81" Height
Max. Weight: 48 Lbs

S-Band Klystron Product Specification

TYPE VKS-8287 PULSED KLYSTRON AMPLIFIER

DESCRIPTION: Pulsed Klystron Amplifier, operable up to 1.5 Megawatts Peak Power, 2.7 GHz to 3.0 GHz, Integral Tunable Cavities, Solenoid Focused, Waveguide Output, Coaxial Input, Forced Air Cooled

ABSOLUTE RATINGS: Notes 1 and 2

Parameters:	Ef	If(surge)	epy	epx	lk	Ik	pi
Units:	V	A	kv	kv	a	mA	Mw
Maximum:	8.0	50	88	-33	50	100	4.25
Minimum:	---	---	---	---	---	---	---
Notes:	4&5		6&7		8	8	

Parameters:	Pi	pd	Pd	po	Po	tp(epy)	tp(rf)
Units:	kW	W	mW	Mw	kW	s	s
Maximum:	6.6	10	20	1.8	2.5	8.0	7.0
Minimum:	---	---	---	---	---	---	---
Notes:	29	9	9	29	29	10	3 & 11

Parameters:	Load	Coolant Air	Tuner	Waveguide
Units:	VSWR	Flow	Torque	Pressure
Maximum:	1.5:1	cfm	in-oz	psig, dry air
Minimum:	---	---	200	30
Notes:	12	160	---	---
		13	12	

Mounting Position: Any

Tuning: Individual cavity, digital read
out on Electromagnet,
Varian P/N 64276

Cooling: Forced Air; Note 13 and 14

Ion Pump: Note 15 and Note 30

Base: Socket; Varian P/N 91370

RF Input Conn: Mates with Type "N",
coaxial plug UG-21/D/U,
or equivalent

Modulator: Cathode pulsed

RF Output Conn: Mates with Waveguide Flange
UG-1725/U or equivalent

Cathode: Oxide Coated, unipotential

Focusing: Varian Electromagnet (solenoid)
VA-1587E or VA-1587F; Notes 16 & 31

X-ray Shielding: Note 17

Operating Waveguide Pressure: 2 psig
minimum of Freon 12 or gas
with equivalent pressure/
dielectric rating.

Dimensions: See Outline Drawing, Page 6

GENERAL

Unless otherwise required as a line item in the Purchase Order or Contract, only Quality Conformance Inspection, Part 1 (normal Production Testing) will be performed.

References shown in parenthesis are to paragraphs in MIL-E-1, Military Specifications for Electron Tubes. References not in parenthesis are to paragraphs in MIL-STD-1311, Test Methods for Electron Tubes. Only those paragraphs of MIL-E-1 and MIL-STD-1311 referenced in this specification shall apply.

<u>Ref</u>	<u>Test</u>	<u>Conditions</u>	<u>Min</u>	<u>Max</u>
(3.6.4)	Marking			
4.8.5	Holding Period	t = 48 hr (min) See Note 28		
---	Packaging	VA Std. Commercial Transport		

NOTES

- Note 1: Referring to paragraph (6.5) of MIL-E-1, these values are based on the "absolute system" and should not be exceeded under continuous or transient conditions. A single rating may be the limitation and simultaneous operation at another rating may not be possible. Design values for systems should include a safety factor to maintain operation within ratings under voltage and environmental variations. The Life Warranty is predicated on operation of tube under the specified Test Conditions given in the heading on Page 1 of this Tube Specification Sheet.
- Note 2: All voltages except heater voltage are referenced to the cathode.
- Note 3: The tube is capable of rated power output at any rf pulse length from 0.5 to 6 μ s inclusive.
- Note 4: When heater power is applied to a cold tube, the heater voltage shall be adjusted from 0 to nameplate value within a period of not less than 20 seconds, in a manner that will not cause $I_f > 50$ A. This value of heater voltage shall be maintained for at least 12 minutes prior to the application of beam voltage.
- The gun end of tube must be immersed in insulating oil whenever heater power is applied.
- Note 5: Interlocks should be provided to prevent application of beam voltage unless the heater voltage is within +5% of nameplate value (5.0 Vac to 7.0 Vac), and has been applied for the period of time specified in Note 4.
- Note 6: The electron gun insulator shall be operated in an insulating oil, such as Univolt 35, Shell DIALA-AX, or equivalent.

- Note 7: Interlocks should be provided to prevent application of beam voltage greater than 10% above the nameplate value, as well as preventing exceeding the Absolute Ratings.
- Note 8: Interlocks should be provided to prevent the cathode (beam) current from exceeding value greater than 10% above normal operating values, as well as preventing exceeding the Absolute Ratings.
- Note 9: a. The tube shall not be damaged when operated at a maximum rated rf drive power when the beam voltage is removed.
b. The tube shall not be damaged when operated at maximum rated beam voltage when the rf drive is removed.
- Note 10: The beam pulse width shall be measured between the 70% points of the beam voltage pulse.
- Note 11: The rf pulse width shall be measured between the 3 dB points of the rf output pulse.
- Note 12: The tube will not be damaged when operated into a load mismatch of 1.5:1 of any phase. In addition, it shall be capable of briefly withstanding (15 msec, max) a mismatch as great as 3.0:1.
- Note 13: The minimum coolant air flow rate required increases practically linearly with altitude. For example, at 10,000 ft above sea level the minimum flow rate for the same inlet air temperature, must be increased to 1.37 times the minimum flow rate required at sea level. Air flow = 160 (1 + 0.037 x thousands of feet) cfm.
- Note 14: Cooling air interlocks should prevent the application of heater voltage and electromagnet (solenoid) currents unless the cooling air flow is at or above the specified minimum flow rate.

Note 15: A VacIon Pump shall be an integral part of each tube. This ion pump shall operate at +3000 Vdc \pm 300 Vdc from a high impedance power supply capable of delivering 100 μ A. For normal tube operation, the ion pump current shall be less than 20 μ Adc.

Note 16: Interlocks should be provided to prevent application of beam voltage unless solenoid coil currents are within \pm 10% of the specified values.

Note 17: It is the responsibility of the tube manufacturer to provide sufficient x-ray shielding to reduce radiation to 2 mr/hr at a distance of 1 ft from any integral part of the klystron above the plane of the bottom of the baseplate of the focusing solenoid excepting the conical projection of the output waveguide, when the tube is in the proper focusing solenoid which is equipped with an X-ray shield, VA Drawing 139158 or equivalent, and operated at the rated conditions for the Power Output test. It is the responsibility of the equipment manufacturer to provide x-ray shielding for radiation below the plane of the bottom of the baseplate of the focusing solenoid. It is also the responsibility of the equipment manufacturer to provide any additional x-ray shielding necessary to meet all required safety standards when the tube is operated in the manufacturer's equipment. The tube manufacturer shall have no responsibility for excess radiation or radiation leakage arising from alterations to the tube and/or the focusing solenoid, or from operation beyond the specified operating parameters necessary to achieve Power Output Test Conditions.

Note 18: No voltages applied. Amplitude 10 G, duration 0.011 second. Tube shall be tested in a standard drop type, shock testing machine. Tube shall be shocked three times in each of three mutually perpendicular planes, one of which shall be parallel to the axis of the electron beam. After this test, the tube shall meet Power Output test.

Note 19: No voltage will be applied during vibration test. The tube shall be mounted rigidly on a table vibrating with simple harmonic motion along the X-axis of the tube. Amplitude of table vibration shall be 0.040 ± 0.005 in.). Frequency of vibration shall be 25 Hz. The tube shall be vibrated at the specified frequency and amplitude for 1 minute. After this test, the tube shall meet Power Output test.

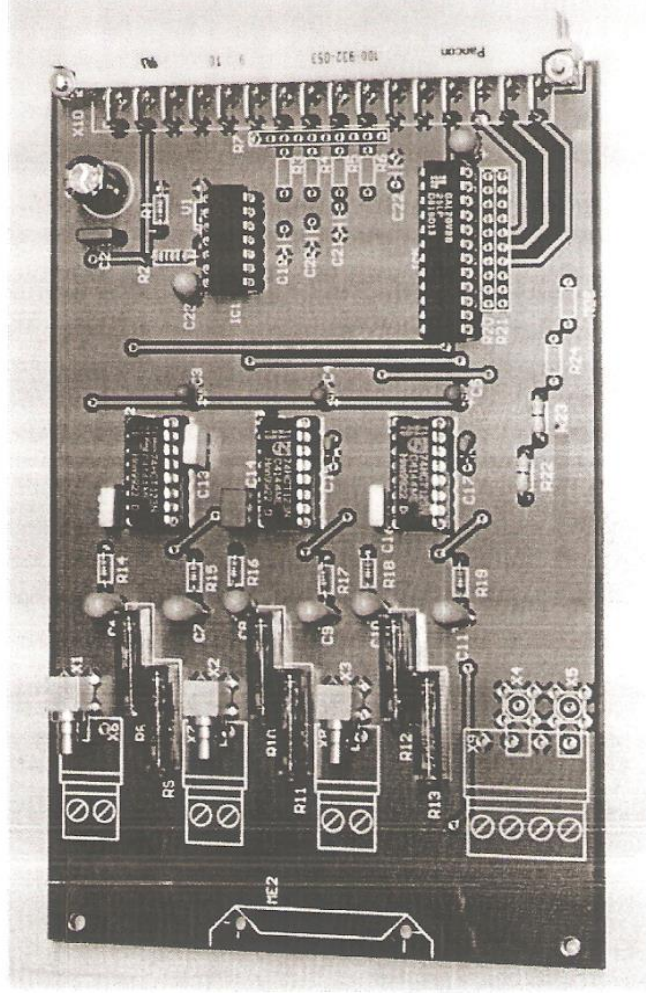
Note 20: The rf phase shift between the rf input and rf output shall not change more than 14° for a 1% change in beam voltage.

- Note 21: All spurious outputs except modulation products and harmonics shall be more than 60 dB below the output power at the rf drive frequency.
- Note 22: All harmonic output power shall be more than 30 dB below the output power at the rf drive frequency.
- Note 23: Cak to be measured in air without socket cups or flying leads.
- Note 24: When operating under Cathode Current test conditions, the filament voltage is decreased by 0.5 V, and the cathode emission allowed to restabilize. The peak cathode current change shall not exceed 2.0 A.
- Note 25: When operating under Power Output test conditions, the test will be performed over the frequency range of 2.7 to 3.0 GHz at 20 MHz intervals. The tube beam voltage and rf drive level shall be specified on the individual tube data sheet for each frequency tested. The tuner cavity settings shall be recorded on the data sheet.
- Power Output must be within the limits specified at all frequencies. Drive power may vary between tunings.
- Peak drive power will be 9.0 w or less under all conditions.
- For Power Output test operation, minimum rf conversion efficiency will be at least 43% for optimum tuning at each frequency. (Typical efficiency at 0.75 megawatts power output is 48%.)
- Note 26: "Drive Power" is defined as the power incident on the input connector.
- Note 27: For purposes of testing to this specification, video pulse widths up to 8 usec may be used provided the conditions of Note 29 are complied with.
- Note 28: The purpose of the Vacuum Test is to check the tube's vacuum integrity and is the only test that must be performed after the Holding Period.

- Note 29: At other beam voltages, the tube is capable of peak power levels up to 1.8 Mw. Beam and rf duty cycles must be selected to limit $P_o = 2.5$ kw max and $P_{in} = 6.6$ kw max.
- Note 30: The ion pump connector on the klystron mates with VA Part Number 924-0749 (a high voltage connector with integral 10 foot long, unterminated cable) or with VA Part Number 924-0750 Cable Assembly that mates with VA power supply No. 921-0015 or equivalent.
- Note 31: The only difference between the two versions of focusing solenoid specified is in the type of electrical connections; the "E" version incorporates a screw-type barrier terminal block while the "F" version has an MS-3452 W-22-2P connector.
- Note 32: In May 1985 the klystron was qualified for the U.S. Department of Commerce NEXRAD program using VA Qualification Test Procedure Instruction 5.513, Revision Issue, and VA Acceptance Test Procedure Instruction 5.484, Revision A.

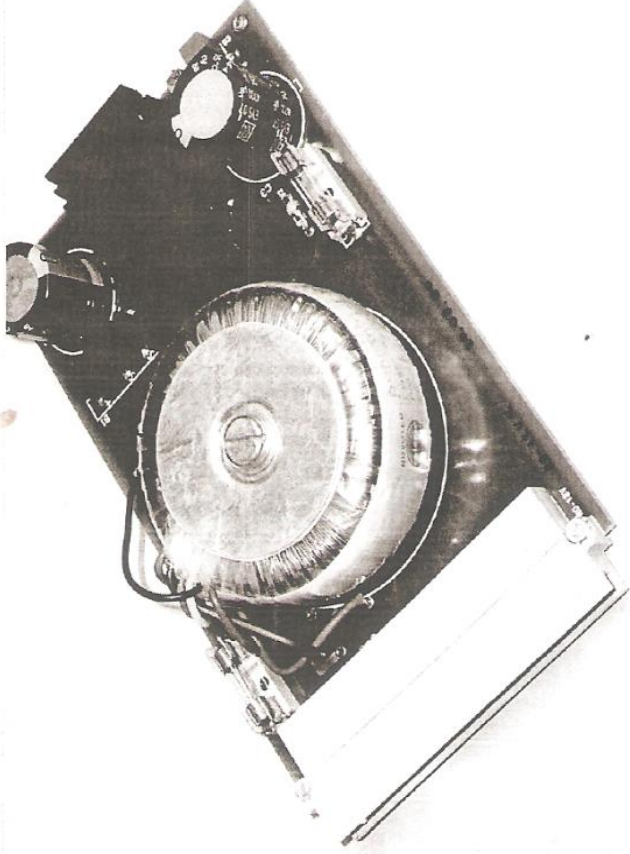
Trigger timing board

- Receives the trigger signal from the RSP/receiver
- Delivers the delayed trigger for the gun arc detector board
- Observes the trigger length
- Clamps the trigger signals to a maximum length (adjustable)

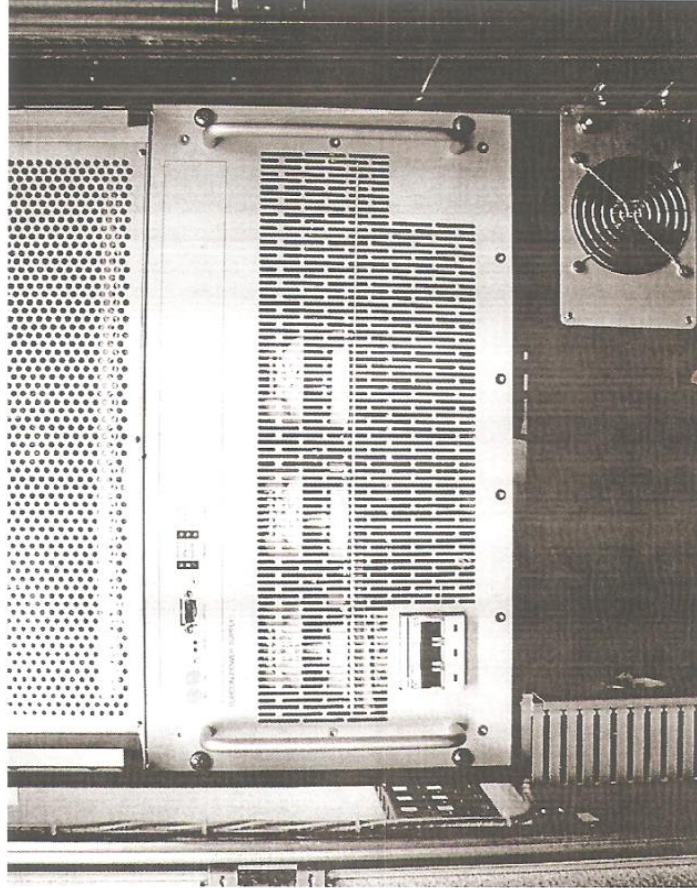


Power supply board 12V

- Delivers the 12V auxiliary voltage which is necessary for the switch array control and safety circuits
- 230V/50Hz input short circuit protected robust adjustable voltage regulator.
- Simple switcher SMPS

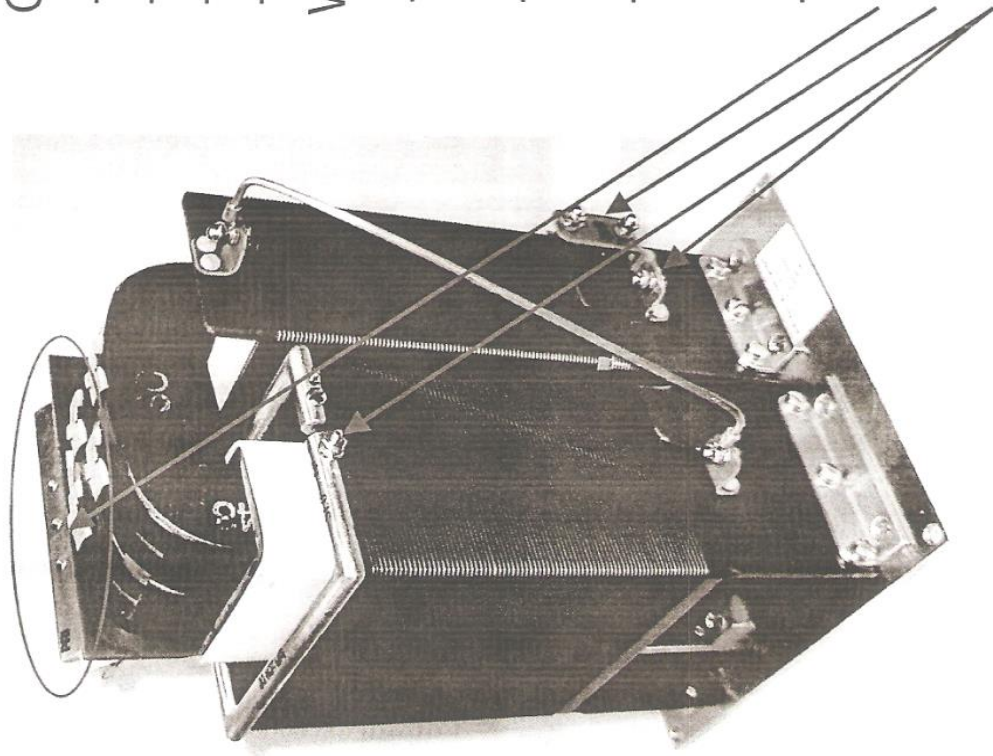


Main Power Supply



- OEM power supply
- very stable output voltage
- 3~400Vac input
- 0 to 1000Vdc output
- 16kW cont. power output
- completely digital control
- Easy to control via the transmitter control system due to standard analogue / digital interfaces

Pulse Transformer



Construction:

- double c core
- epoxy bobbin
- mounted on an aluminium base plate
- unsealed for use in oil or gas

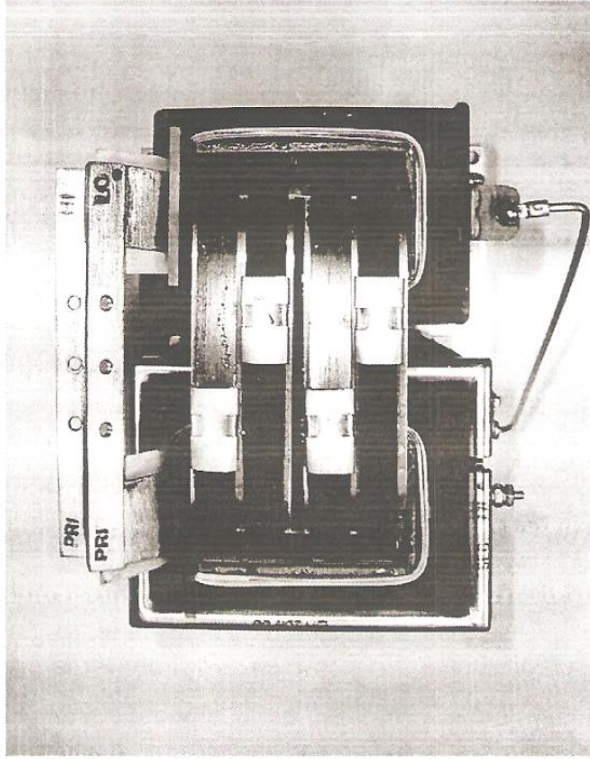
Windings:

- The primary is build out of a solid copper foil ($n = 2$)
- The secondary is wound with an insulated copper wire ($n = 170$)
- The bias winding is also made of this copper wire and placed at the “cold end” of the secondary

Terminals:

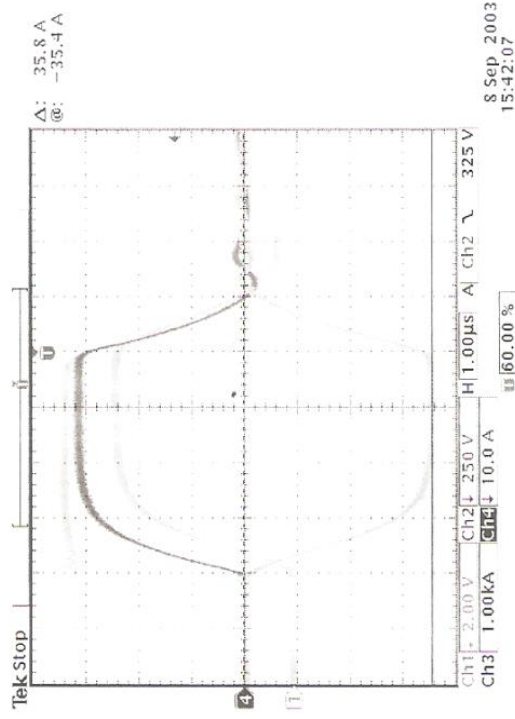
- primary terminal (solid copper)
- bias terminal
- secondary terminals

Pulse Transformer

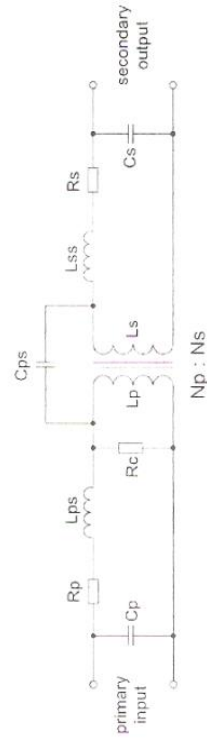


Parasitic effects:

- Big gaps between the windings reduce the parasitic capacitance
- A nearly complete inter winding coverage keeps the stray inductance low and ensures a good coupling .

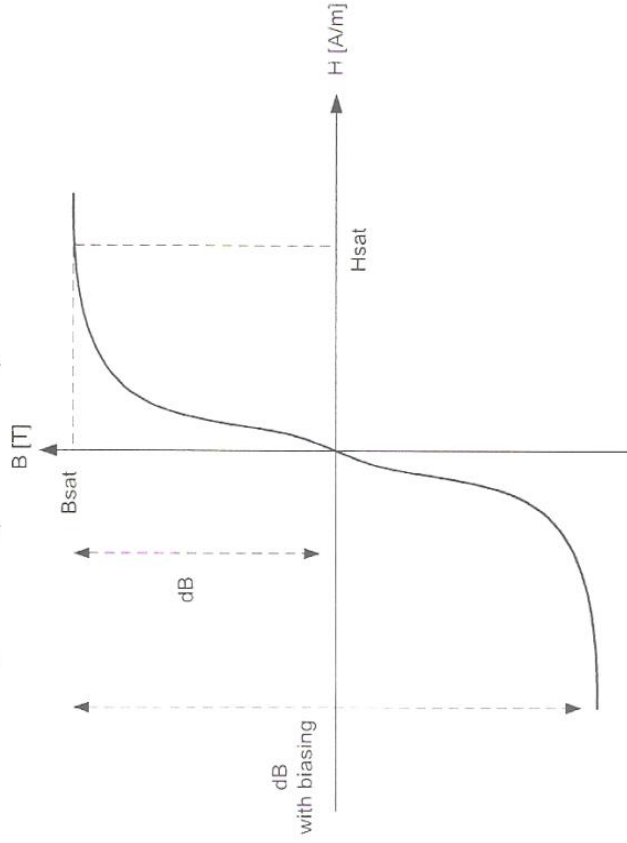


Pulse transformer equivalent circuit



Pulse Transformer

Simplified (lossless) B-H-curve



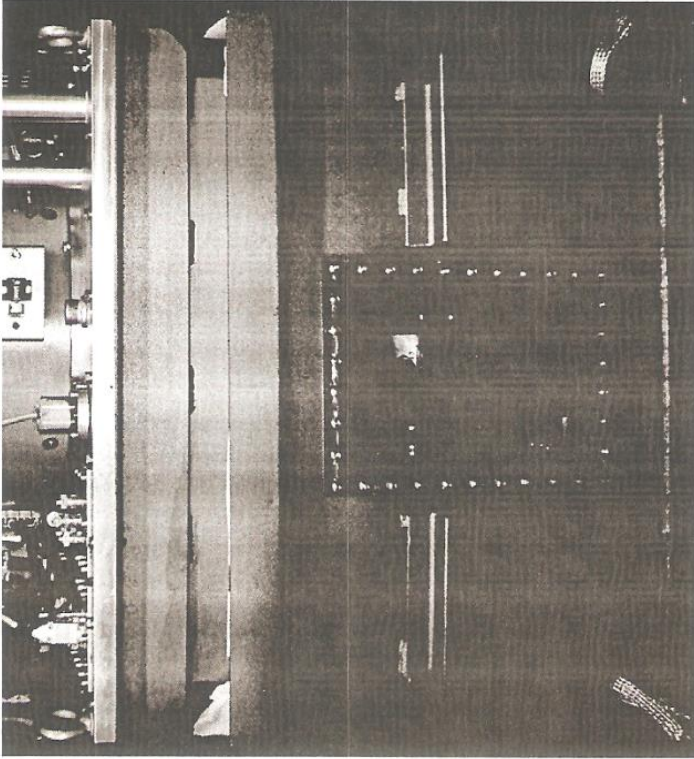
The pulse cycle:

- The maximum pulse width a transformer can supply fits the following equation:

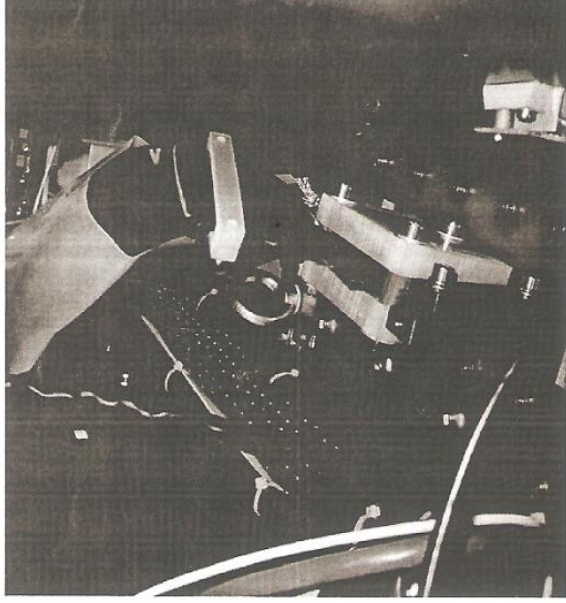
$$U * tp = np * B_{sat} * A_{core}$$

Where: U = primary voltage
 tp= max pulsewidth
 np= number of primary turns
 Bsat = max Induction
 Acore = cross sectional area is.

Pulse Transformer

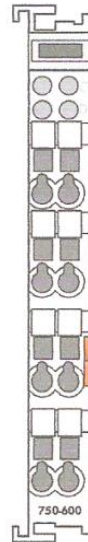


- The transformer is mounted inside the klystron tank which is filled with insulating oil
- The connection to the modulator is realized by a strong copper terminal at the tank cover plate and a copper strip line



750-600

End Module



After the fieldbus node is assembled with the correct buscoupler and selected I/O modules, the end module is snapped onto the assembly.

It completes the internal data circuit and ensures correct data flow.

Description	Item No.	Pack. Unit
End Module	750-600	10 ¹⁾
End Module/T (Operating temperature -20 °C ... +60 °C)	750-600/025-000	1
¹⁾ Also available individually		
Accessories	Item No.	Pack. Unit
Miniature WSB Quick marking system		
plain	248-501	5
with marking	see www.wago.com	
Approvals		
CE		
Shipbuilding	see "Approvals Overview" in section 1	
UL508		
ANSI/ISA 12.12.01	Class I Div 2 ABCD T4	750-600
EN 60079-0, -1, -15	I M2 Ex d I	750-600*
EN 61241-0, -1	II 3 G Ex nA IIC T4	750-600*
	II 3 D Ex tD A22 IP6X T135 °C	750-600*
	* Permissible operating temperature 0 °C ... +60 °C	
Note: For additional information on regulations and test results, see Section 12.		

Technical Data	
Width	12 mm
Weight	33.5 g
EMC CE-Immunity to interference	acc. to EN 61000-6-2 (2005)
EMC CE-Emission of interference	acc. to EN 61000-6-4 (2007)
EMC marine applications - Immunity to interference	acc. to Germanischer Lloyd (2003)
EMC marine applications - Emission of interference	acc. to Germanischer Lloyd (2003)

750-402, 750-403 / 753-402, 753-403

4-Channel Digital Input Module DC 24 V

2- to 3-conductor connection; high-side switching

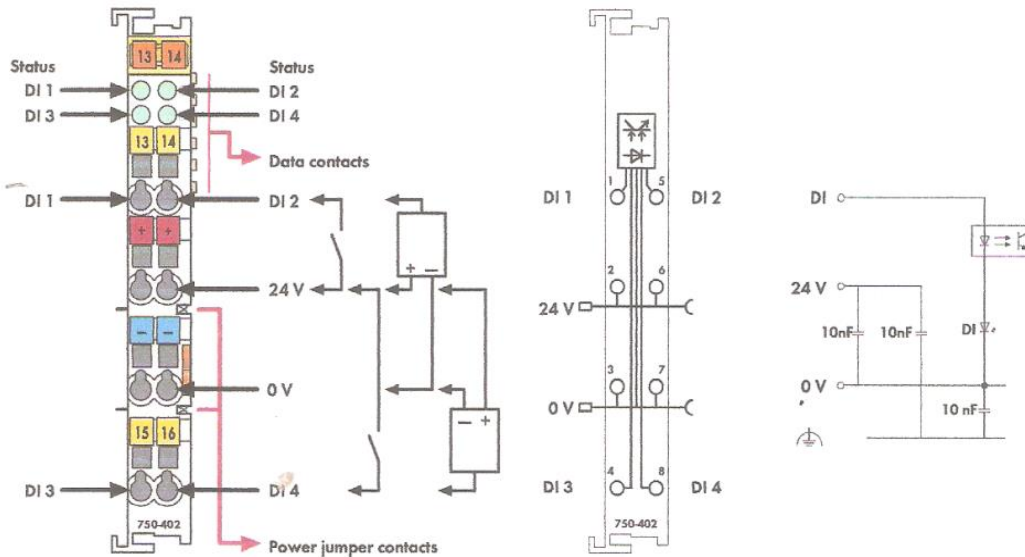


Fig. Series 750 / Technical data see page 28 / Delivery without Mini WSB marker
Series 750 / 753 marking see pages 16 ... 17 / 18 ... 19

The digital input modules receive the control signal from digital field devices (sensors, etc.).

Each input module has a noise-rejection filter. This filter is available with different time constants.

An optocoupler is used for electrical isolation between the bus and the field side.

Description	Item no.	Pack. unit
4DI 24V DC 3.0ms	750-402	10 ¹⁾
4DI 24V DC 0.2ms	750-403	10 ¹⁾
4DI 24V DC 3.0ms (Operating temperature -20 °C ... +60 °C)	750-402/025-000	1
4DI 24V DC 3.0ms (without connector)	753-402	10 ¹⁾
4DI 24V DC 0.2ms (without connector)	753-403	10 ¹⁾
¹⁾ Also available individually		
Accessories	Item no.	Pack. unit
753 Series connector	753-110	25
Coding elements	753-150	100
Miniature WSB quick marking system, plain	248-501	5
Miniature WSB quick marking system, with marking	see pages 256 ... 257	
Approvals		
Series 750 and 753		
UL 508		
Conformity marking	CE	
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
Series 750		
EN 60079-15	I M2 / II 3 GD Ex nA IIC T4	
Marine applications	see "Approvals Overview" in section 1	

Technical Data	
No. of inputs	4
Current consumption (internal)	7.5 mA
Voltage via power jumper contacts	DC 24 V (-25 % ... +30 %)
Signal voltage (0)	DC -3 V ... +5 V
Signal voltage (1)	DC 15 V ... 30 V
Input filter	3.0 ms (750-402 / 753-402) 0.2 ms (750-403 / 753-403)
Input current (typ.)	4.5 mA
Isolation	500 V system/supply
Internal bit width	4 bits
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm ² ... 2.5 mm ² / AWG 28 ... 14
Stripped lengths (750 / 753 Series)	8 ... 9 mm / 0.33 in 9 ... 10 mm / 0.37 in
Width	12 mm
Weight	48.5 g
EMC CE-Immunity to interference	acc. to EN 61000-6-2 (2001)
EMC CE-Emission of interference	acc. to EN 61000-6-3 (2001)
EMC marine applications - Immunity to interference	acc. to Germanischer Lloyd (2003)
EMC marine applications - Emission of interference	acc. to Germanischer Lloyd (2003)

4-Channel Digital Output Module 24 V DC

Short-circuit protected; high-side switching

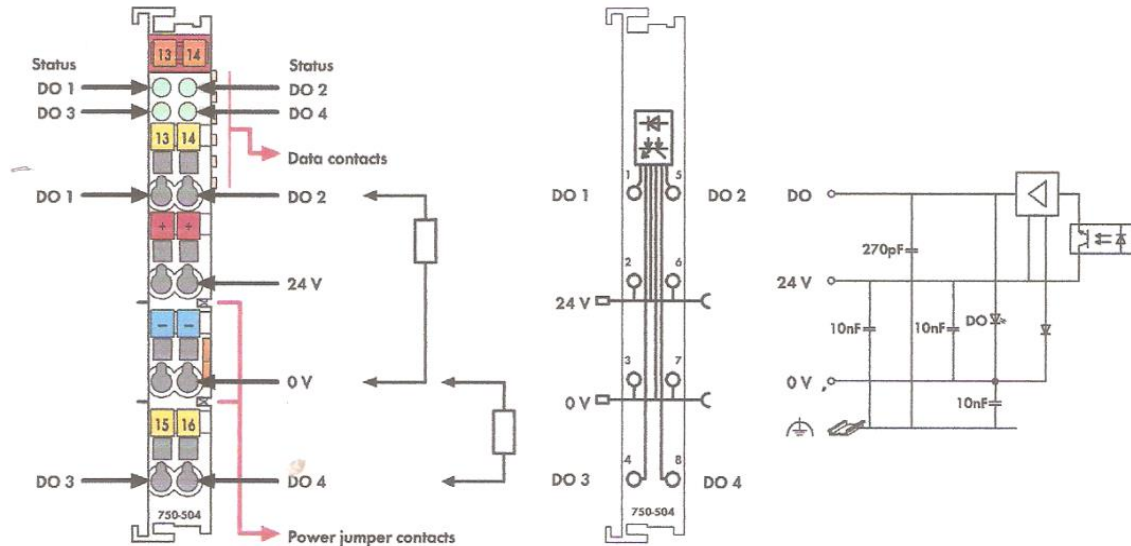


Fig. 750 Series/Technical data see page 24/Delivered without miniature WSB markers
750/753 Series marking see pages 10 ... 11 / 12 ... 13

The connected load is switched via the digital output from the control system.

All outputs are electronically short-circuit-protected.

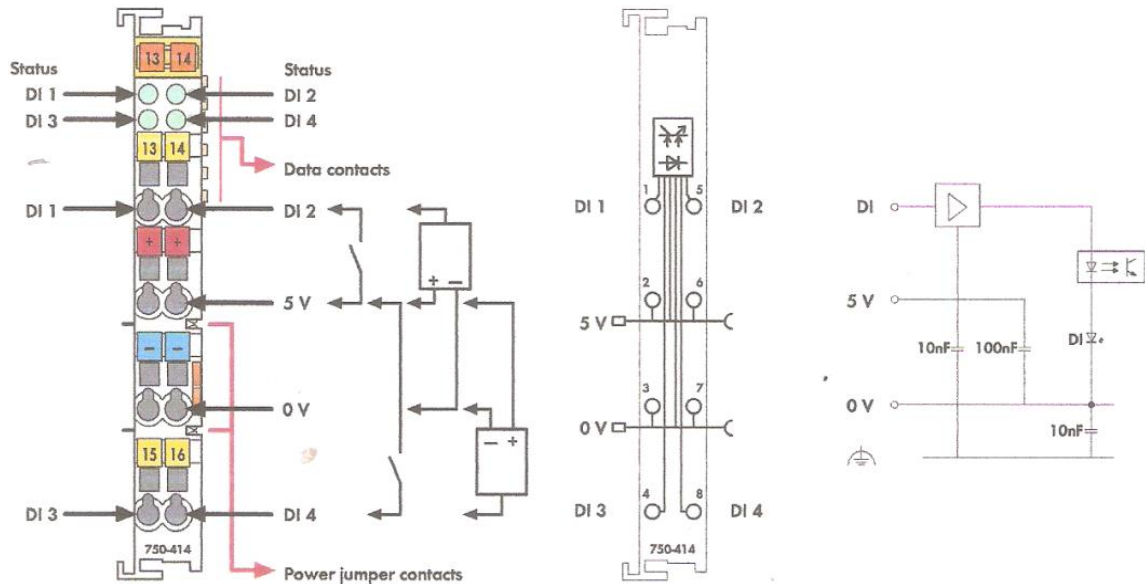
Each output is electrically isolated from the bus by use of optocouplers.

Description	Item No.	Pack. Unit
4DO 24V DC 0.5A	750-504	1 ¹⁾
4DO 24V DC 0.5A/R*	750-504/000-800	1
4DO 24V DC 0.5A/T	750-504/025-000	1
(Operating temperature -20 °C ... +60 °C)		
4DO 24V DC 0.5A/T/R*	750-504/025-800	1
(Operating temperature -20 °C ... +60 °C)		
4DO 24V DC 0.5A (without connector)	753-504	1
* /R: Interference-free for safety function applications (see manual)		
¹⁾ Also available individually		
Accessories	Item No.	Pack. Unit
753 Series Connectors	753-110	25
Coding elements	753-150	100
Miniature WSB Quick marking system plain	248-501	5
Miniature WSB Quick marking system with marking	see pages 352 ... 353	
Approvals	Also see "Approvals Overview" in Section 1	
Conformity marking	CE	
Shipbuilding (versions upon request)	ABS, BV, DNV, GL, KR, LR*, NKK*, PRS*, RINA* *753 Series, pending	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	75x-504, 750-504/000-800
EN 60079-0, -15	I M2 / II 3 GD Ex nA IIC T4	75x-504, 750-504/000-800
EN 61241-0, -1		

Technical Data	
No. of outputs	4
Current consumption (internal)	10 mA
Voltage via power jumper contacts	24 V DC (-25 % ... +30 %)
Type of load	resistive, inductive, lamps
Max. switching frequency	1 kHz
Output current (max.)	0.5 A, short-circuit protected
Inductive load switch off energy	
dissipation W (max.)	0.3 J; L max = 2 x W max / I ²
Current consumption typ. (field side)	15 mA / module + charge
Isolation	500 V system/supply
Internal bit width	4 bits
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm ² ... 2.5 mm ² / AWG 28 ... 14
Stripped lengths, 750/753 Series	8 ... 9 mm / 0.33 in 9 ... 10 mm / 0.37 in
Width	12 mm
Weight	49.5 g
EMC: CE - immunity to interference	acc. to EN 60000-6-2 (2005)
EMC: CE - emission of interference	acc. to EN 61000-6-4 (2007)
EMC: marine applications	
- immunity to interference	acc. to Germanischer Lloyd (2003)
EMC: marine applications	
- emission of interference	acc. to Germanischer Lloyd (2003)

4-Channel Digital Input Module DC 5 V

2- to 3-conductor connection; high-side switching



Delivery without Mini WSB marker

The digital input module receives control signals from digital field devices (sensors, etc.).

Each input module has a noise-rejection filter.

An optocoupler is used for electrical isolation between the bus and the field side.

Notice:

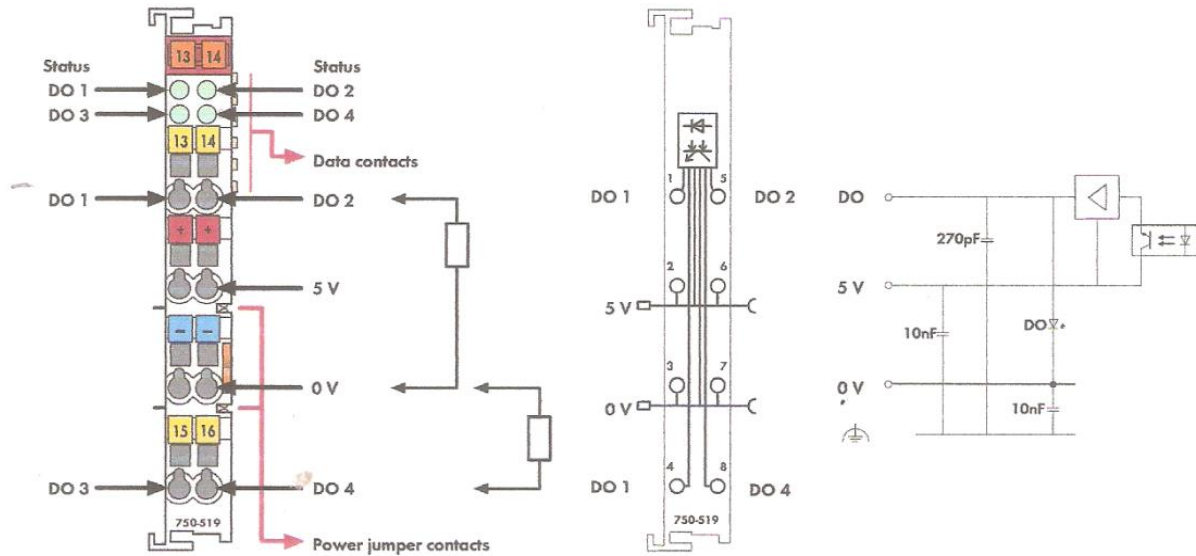
An additional supply module must be added for operation with DC 5 V!

Description	Item no.	Pack. unit
4DI 5V DC 0.2ms	750-414	1
Accessories		
Miniature WSB quick marking system, plain	248-501	5
with marking	see pages 256 ... 257	
Approvals		
Series 750		
Conformity marking	CE	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
EN 50021	II 3 G EEx nA II T4	

Technical Data	
No. of inputs	4
Current consumption (internal)	5 mA
Voltage via power jumper contacts	DC 5 V
Signal voltage (0)	DC 0 V ... +0.8 V
Signal voltage (1)	DC 2.4 V ... 5 V
Input filter	0.2 ms
Input current (typ.)	50 µA
Isolation	500 V system/supply
Internal bit width	4 bits
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm² ... 2.5 mm² / AWG 28 ... 14
Stripped lengths	8 ... 9 mm / 0.33 in
Width	12 mm
Weight	49.5 g
EMC CE-Immunity to interference	acc. to EN 50082-2 (1996)
EMC CE-Emission of interference	acc. to EN 50081-1 (1993)

4-Channel Digital Output Module DC 5 V

short-circuit protected; high-side switching



Delivery without Mini WSB marker

The connected load is switched via the digital output from the control system.

All outputs are electronically short-circuit-protected.

An optocoupler is used for electrical isolation between the bus and the field side.

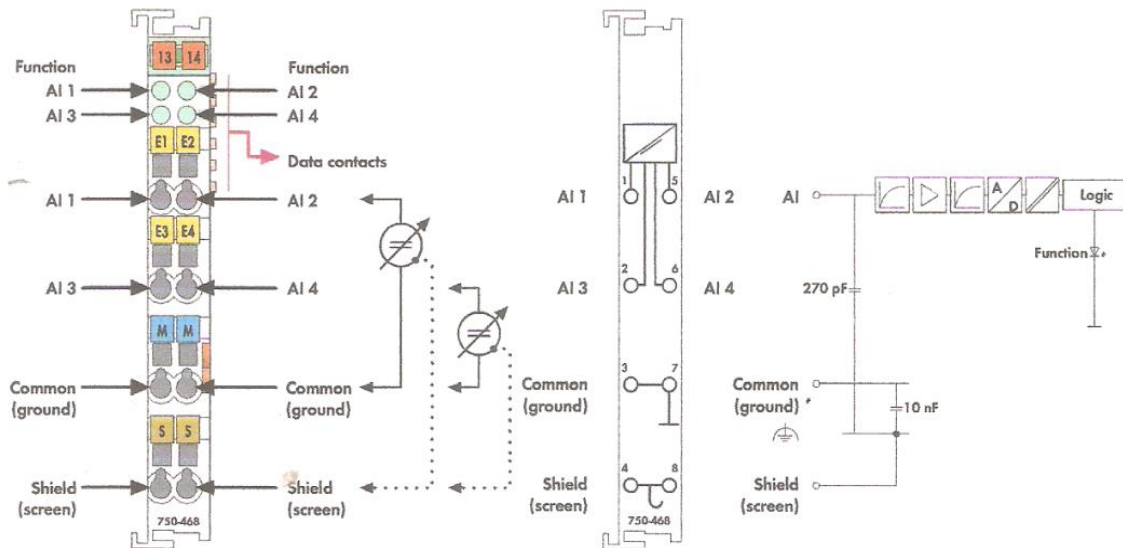
Notice:

An additional supply module must be added for operation with DC 5 V!

Description	Item no.	Pack. unit
4DO 5V DC 20mA	750-519	1
Accessories		
Miniature WSB quick marking system, plain	248-501	5
with marking	see pages 256 ... 257	
Approvals		
Series 750		
Conformity marking	CE	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
EN 50021	II 3 GD EEx nA II T4	

Technical Data	
No. of outputs	4
Current consumption max. (internal)	10 mA
Voltage via power jumper contacts	DC 5 V
Type of load	resistive, inductive, lamps
Switching rate (max.)	5 kHz
Output current (max.)	20 mA short-circuit protected
Current consumption typ. (field side)	14 mA
Isolation	500 V system/supply
Internal bit width	4 bits in; 4 bits out
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm² ... 2.5 mm² / AWG 28 ... 14
Stripped lengths	8 ... 9 mm / 0.33 in
Width	12 mm
Weight	50 g
EMC CE-Immunity to interference	acc. to EN 50082-2 (1996)
EMC CE-Emission of interference	acc. to EN 50081-1 (1993)

4-Channel Analog Input Module 0-10 V single-ended (S.E.)



Delivery without Mini WSB marker

The analog input module receives signals with the standardized values of 0-10 V.

The input signal is electrically isolated and will be transmitted with a resolution of 12 bits.

The internal system voltage supply is used for the power supply of the module.

The input channels of a module have one common ground potential.

The shield (screen) is directly connected to the DIN rail.

Description	Item no.	Pack. unit
4AI 0-10V DC S.E.	750-468	1
4AI 0-10V DC S.E. S5 ²⁾	750-468/000-200	1
4AI 0-10V DC S.E./T (Operating temperature -20 °C ... +60 °C)	750-468/025-000	1
²⁾ Data format for S5 control with FB 251		
Accessories	Item no.	Pack. unit
Miniature WSB quick marking system,		
plain	248-501	5
with marking	see pages 256 ... 257	
Approvals		
Series 750		
Conformity marking	CE	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
EN 60079-15	I M2 / II 3 GD Ex nA IIC T4	
Marine applications	see "Approvals Overview" in section 1	

Technical Data

No. of inputs	4
Voltage supply	via system voltage DC/DC
Current consumption typ. (internal)	60 mA
Input voltage (max.)	35 V
Signal voltage	0 ... 10 V
Internal resistance	133 kΩ
Resolution	12 bits
Conversion time (typ.)	4 ms
Measuring error (25 °C)	≤ ± 0.2% of the full scale value
Temperature coefficient	< ± 0.01 % / K of the full scale value
Isolation	500 V system/supply
Bit width	4 x 16 bits data 4 x 8 bits control/status (optional)
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm ² ... 2.5 mm ² / AWG 28 ... 14
Stripped lengths	8 ... 9 mm / 0.33 in
Width	12 mm
Weight	52.5 g
EMC CE-Immunity to interference	acc. to EN 50082-2 (1996)
EMC CE-Emission of interference	acc. to EN 50081-1 (1993)
EMC marine applications - Immunity to interference	acc. to Germanischer Lloyd (2003)
EMC marine applications - Emission of interference	acc. to Germanischer Lloyd (2003)

750-550, 750-556 / 753-550, 753-556

2-Channel Analog Output Module 0-10 V/±10V

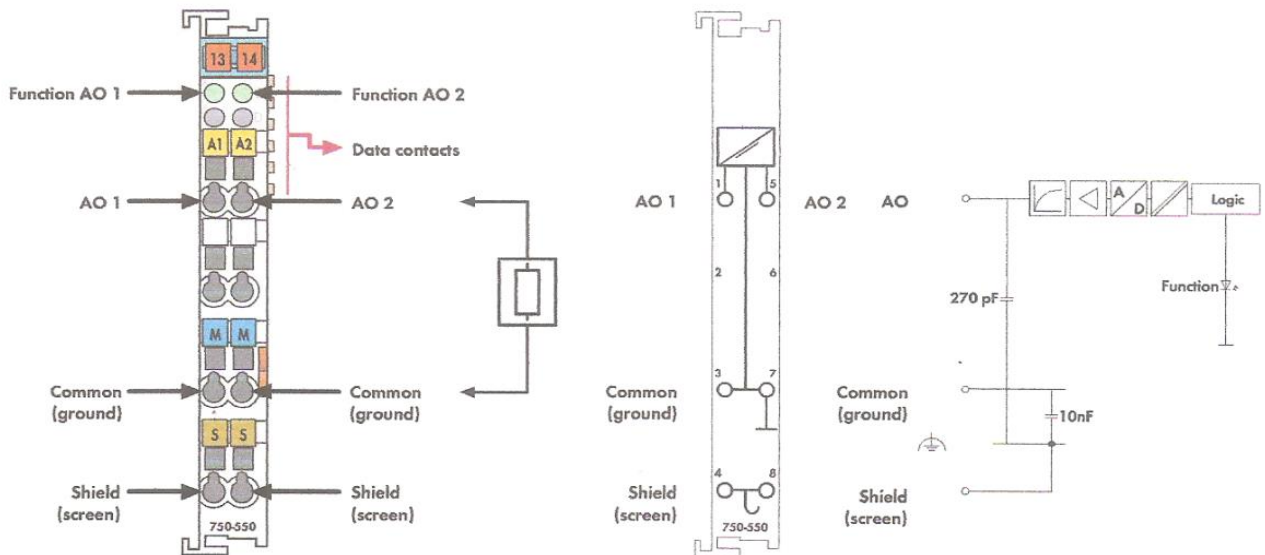


Fig. 750 Series/Technical data see page 24/Delivered without miniature WSB markers
750/753 Series marking see pages 12 ... 13 / 14 ... 15

The analog output module creates a standardized signal of 0-10V or ±10V.

The output signal is electrically isolated and will be transmitted with a resolution of 12 bits.

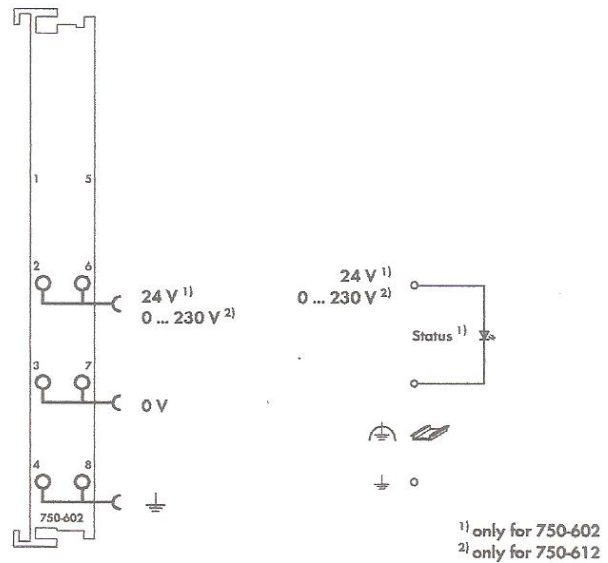
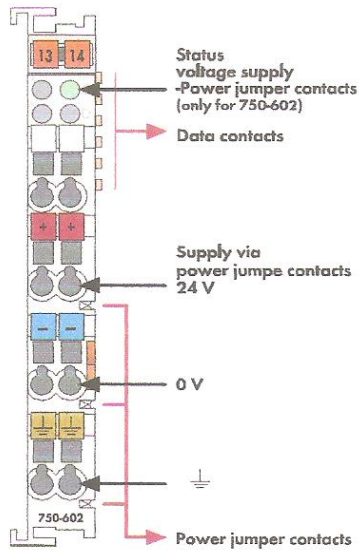
Outputs are short circuit protected.

The internal system supply is used for the power supply of the module.

The output channels have one common ground potential.

Description	Item No.	Pack. Unit
2AO 0-10V DC	750-550	10 ¹⁾
2AO ± 10V DC	750-556	10 ¹⁾
2AO 0-10V DC/S5 ²⁾	750-550/000-200	1
2AO ±10V DC/S5 ²⁾	750-556/000-200	1
2AO 0-10V DC (without connector)	753-550	10 ¹⁾
2AO ±10V DC (without connector)	753-556	10 ¹⁾
¹⁾ Also available individually		
²⁾ Data format for S5 control with FB 251		
Accessories	Item No.	Pack. Unit
753 Series Connectors	753-110	25
Coding elements	753-150	100
Miniature WSB Quick marking system plain	248-501	5
Miniature WSB Quick marking system with marking	see pages 304 ... 305	
Approvals		
750 and 753 Series		
Conformity marking	CE	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
750 Series	(Approvals for product variations upon request)	
EN 60079-15	I M2 / II 3 GD Ex nA IIC T4	
Shipbuilding	see "Approvals Overview" in section 1	

Technical Data	
No. of outputs	2
Current consumption (internal)	65 mA
Voltage supply	via system voltage DC/DC
Signal voltage	0 V ... 10 V (750-550, 753-550) ±10 V (750-556, 753-556)
Load impedance	> 5 kΩ
Linearity	±10 mV
Resolution	12 bits
Conversion time	approx. 2 ms
Recovery time (typ.)	300 μs
Measuring error (25 °C)	< ± 0.1 % of the full scale value
Temperature coefficient	< ± 0.01 % /K of the full scale value
Isolation	500 V system/supply
Bit width	2 x 16 bits data 2 x 8 bits control/status (option)
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm ² ... 2.5 mm ² / AWG 28 ... 14
Stripped lengths, 750/753 Series	8 ... 9 mm / 0.33 in 9 ... 10 mm / 0.37 in
Width	12 mm
Weight	50.5 g
EMC CE-Immunity to interference	acc. to EN 61000-6-2 (2005)
EMC CE-Emission of interference	acc. to EN 61000-6-4 (2007)
EMC marine applications - Immunity to interference	acc. to Germanischer Lloyd (2003)
EMC marine applications - Emission of interference	acc. to Germanischer Lloyd (2003)



Delivery without Mini WSB marker

The supply module provides field side power through the power jumper contacts.

Maximum available supply current to all connected modules is 10 A.

Should higher currents be necessary, intermediate supply modules must be added to the assembly. Supply modules may also be used to change the supply voltage to certain I/O modules within the assembly - on one fieldbus node.

Description	Item no.	Pack. unit
24V DC Power Supply	750-602	10 ¹⁾
0-230V AC/DC Power Supply	750-612	10 ¹⁾
24V DC Power Supply/T (Operating temperature -20 °C ... +60 °C)	750-602/025-000	1
¹⁾ Also available individually		
Accessories	Item no.	Pack. unit
Miniature WSB quick marking system, plain	248-501	5
with marking	see pages 256 ... 257	
Approvals		
Series 750		
Conformity marking	CE	
UL 508		
ANSI/ISA 12.12.01	Class I, Div. 2, Grp. ABCD, T4	
EN 60079-15	I M2 / II 3 GD Ex nA IIC T4	
Marine applications	see "Approvals Overview" in section 1	

Technical Data	
Voltage via power jumper contacts (max.)	DC 24 V (750-602) AC / DC 0 V ... 230 V (750-612)
Current via power jumper contacts (max.)	DC 10 A
Wire connection	CAGE CLAMP®
Cross sections	0.08 mm ² ... 2.5 mm ² / AWG 28 ... 14
Stripped lengths	8 ... 9 mm / 0.33 in
Width	12 mm
Weight	44.5 g (750-602) 51.5 g (750-612)
EMC CE-Immunity to interference	acc. to EN 50082-2 (1996)
EMC CE-Emission of interference	acc. to EN 50081-1 (1993)
EMC marine applications - Immunity to interference	acc. to Germanischer Lloyd (2003)
EMC marine applications - Emission of interference	acc. to Germanischer Lloyd (2003)