

# LSTCL01 TCL module

LS communication Turbine interlock logic control

## ■ Summary



### \* Terminal block input / output unit

-52 G ON Digital input	: 1
-Auto stop low oil pressure input	: 1
-Turbine interlock output	: 3
	MSV fully closed, GV fully closed, EV fully closed
-OPC electromagnetic valve output	: 1
-Lamp output	: 2
-DDC mode input	: 1
-OPC operation input	: 3
-External power supply 24 V	: 1

\* USB connector : 1 (For maintenance communication mini-B)

\* Module operating ambient temperature range : -5 to 60°C

## ■ Overview Specifications

ITEM	SPECIFICATION
52 G ON Digital input	DC 24 V × 1, Minimum ON current 2 mA
Auto stop low oil pressure input	DC 24 V × 1, Minimum ON current 2 mA
Turbine interlock output	Open collector output × 3, Maximum voltage DC 30 V, Maximum load resistance 50 mA
OPC electromagnetic valve output	Open collector output × 1, Maximum voltage DC 30 V, Maximum load resistance 50 mA
Lamp output	Open collector output × 2, Maximum voltage DC 30 V, Maximum load resistance 50 mA
DDC mode input	DC 24 V × 1, Minimum ON current 2 mA
OPC operation input	DC 24 V × 3, Minimum ON current 2 mA
External power supply 24 V	DC 24 V × 1
Self-diagnostic functions	Power voltage check, Clock abnormal check, Heartbeat check, CRC check, ADC communication error check
IDOL Implementation	IDOL Implementation
Module Duplication	Correspondence (LSIOB02)
Indicator	Display LED × 4: Run / Status / Network status A / Network status B General purpose display LED × 16: Ch 1 to Ch 16 Status display
USB connector	maintenance communication mini-B × 1
Dielectric strength	AC 2000 V Digital input / output terminal - FG Between AC 1000 V Analog input / output terminal - FG Between
Environmental conditions	Ambient temperature (Operating / Storage) -5 to 60°C Ambient humidity (Operating / Storage) 0 to 95% RH (No condensation)
Operating power supply	DC 24 V ±20% Dual power reception (The voltage supplied from the backplane)
Shock / Vibration	15 G 11 ms / 3.5 mm @5 to 8.4 Hz, 1 G @8.4 to 150 Hz
Dimensions	152.5 mm (D) x 94 mm (H) x 46 mm (W) (Except projection)

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## ■Details Specifications

ITEM		SPECIFICATION		
Terminal block input / output unit	Ch 1: 52 G ON Digital input	Number of channels		1
		Insulation method		Photocoupler insulation
		Dielectric strength		AC 2000 V
		Current range	ON current	DC 2 mA or more
	OFF current		Sense supply voltage:DC 24 V ±10%	
	Ch 2: Auto stop low oil pressure input	Number of channels		1
		Insulation method		Photocoupler insulation
		Dielectric strength		AC 2000 V
		Current range	ON current	DC 2 mA or more
	OFF current		Sense supply voltage:DC 24 V ±10%	
	Ch 3+,Ch 3-,Ch 4+: Turbine interlock output	Number of channels		3 (Open collector)
		Insulation method		Photocoupler insulation
		Dielectric strength		AC 2000 V
		Maximum applied voltage		DC 30 V
		Contact withstand current		50 mA
		Leakage current at OFF		0.1 mA or less
		Maximum residual voltage when ON		DC 1.0 V @50 mA
		Each Ch function	Ch 3+	MSV full closure command
	Ch 3-		GV full closure command	
Ch 4+	EV full closure command			
Ch 4-: OPC electromagnetic valve output	Number of channels		1 Open collector	
	Insulation method		Photocoupler insulation	
	Dielectric strength		AC 2000 V	
	Maximum applied voltage		DC 30 V	
	Contact withstand current		50 mA	
	Leakage current at OFF		0.1 mA or less	
	Maximum residual voltage when ON		DC 1.0 V @50 mA	
Ch 5+, Ch 5-: Lamp output	Number of channels		2 (Open collector)	
	Insulation method		Photocoupler insulation	
	Dielectric strength		AC 2000 V	
	Maximum applied voltage		DC 30 V	
	Contact withstand current		50 mA	
	Leakage current at OFF		0.1 mA or less	
	Maximum residual voltage when ON		DC 1.0 V @50 mA	
	Each Ch function	Ch 5+	All operation terminal automatic lamp output	
Ch 5-		Manual lamp output		
Ch 7+: DDC mode input	Number of channels		1	
	Insulation method		Photocoupler insulation	
	Dielectric strength		AC 2000 V	
	Current range	ON current	DC 2 mA or more	
OFF current		Sense supply voltage:DC 24 V ±10%		
Ch 7-, Ch 8+, Ch 8-: OPC operation input	Number of channels		3	
	Insulation method		Photocoupler insulation	
	Dielectric strength		AC 2000 V	
	Current range	ON current	DC 2 mA or more	
OFF current		Sense supply voltage:DC 24 V ±10%		
Other Ch:	Ch 6+		External ground	
	Ch 6-		External ground	
	Ch 9+		External 24 V power supply plus	
	Ch 9-		External ground	
Calculation cycle usable in DPS		10 msec or more		

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ITEM		SPECIFICATION
Communication specification between IOA	Communication method , Communication speed	LVDS, 100 Mbps
Self-diagnostic functions		Power voltage check (24 V, 3.3 V, 1.2 V, Other) *Refer to block diagram Clock abnormal check (FPGA-MCU) Heartbeat check (FPGA-MCU) CRC check (FPGA-MCU) ADC communication error check Disconnection detection (Ch 1, Ch 2)
IDOL Implementation		no
Module Duplication		Correspondence (LSIOB02 is used for backplane)
Protective function (Backplane supply power protection)		Overvoltage protection, Overcurrent protection
Indicator	Display LED	4: RUN (Run)/STS (Status)/NSA (Network status A)/NSB (Network status B)
	General purpose display LED	16: Ch 1 to Ch 16 Status display
Serial interface	For maintenance	1: USB Serial (USB mini-B connector)
Hot swap		Possible
Operating power supply		DC 24 V $\pm$ 20% Dual power reception (The voltage supplied from the backplane)
Environmental conditions	Module ambient temperature	(Operating / Storage) -5 to 60°C
	Module ambient humidity	(Operating / Storage) 0 to 95% RH (No condensation)
Vibration		3.5 mm @5 to 8.4 Hz
		1 G @8.4 to 150 Hz
Shock		15 G 11 ms
Current consumption		80 mA or less
Weight		0.18 kg
Dimensions		152.5 mm (D) x 94 mm (H) x 46 mm (W) (Except projection)
Standard/Directive		IEC61131-2:2007, RoHS

\*About compliant module type

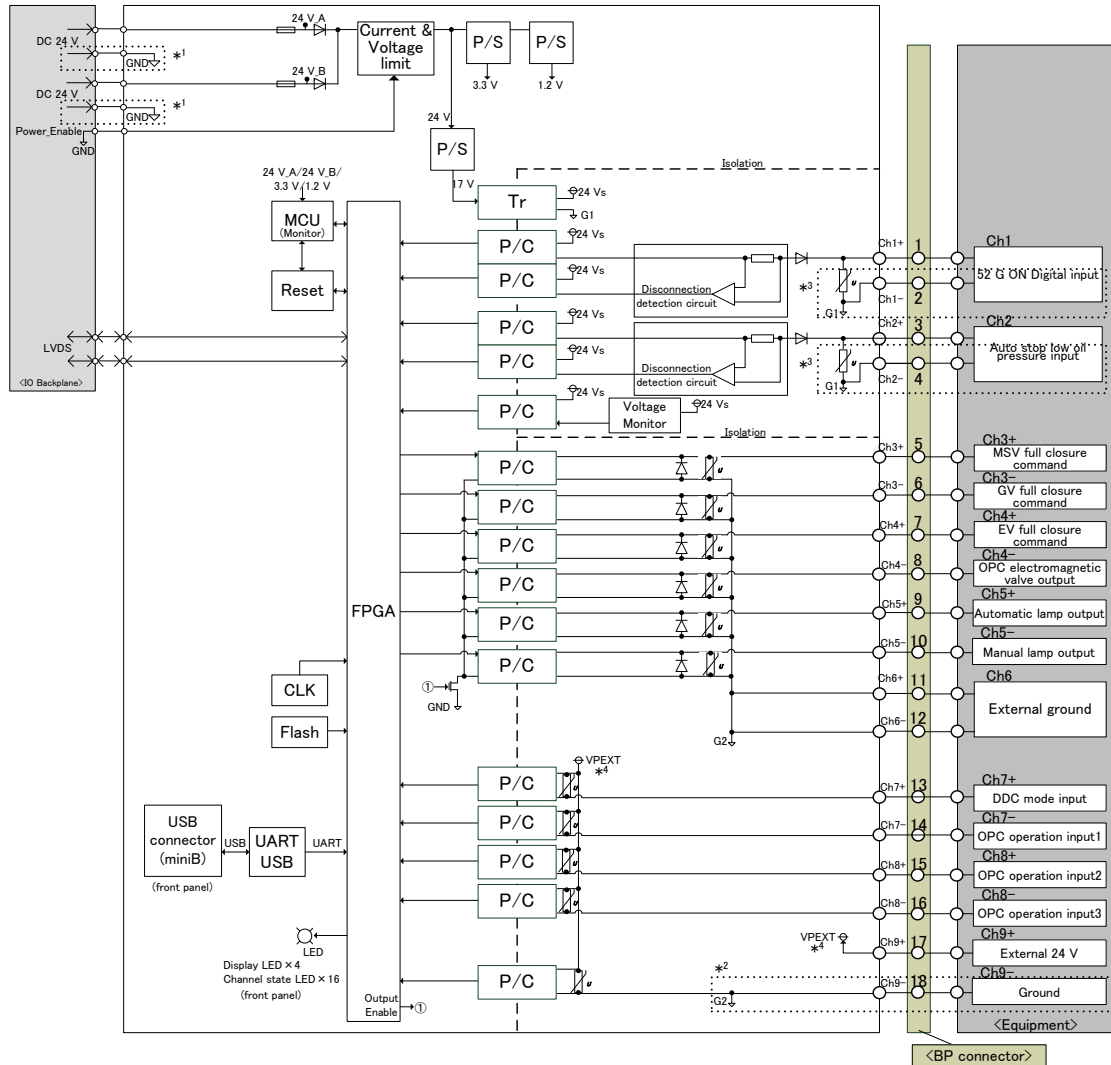
For compliant modules of this product, please refer to "Compliant backplane list (CGS-S9901-E-XX)".

For compliant modules of this product, please refer to "Compliant accessory connector list (CGS-S9902-E-XX)".

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## Block diagram



(Caution) Do not connect 24 V power supply ground(\*1) for system side module operation to other ground (field side power supply 24 V ground(\*2) or 52 G ON / hydraulic input ground(\*3)).

\*4 For digital input, it is necessary to separately apply 24 V power from the outside.

P/S	: Power supply	MCU	: Micro control unit
CLK	: Clock generation circuit	FPGA	: Field programmable gate array
ISO	: Digital isolator	LED	: Light emitting diode
LPF	: Low pass filter	ADC	: Analog digital converter
LVDS	: Low Voltage Differential Signaling	GND,G1,G2	: Ground
P/C	: Photo Coupler	BP	: Backplane
Flash	: Flash ROM	Tr	: Transformer
⊘	: Varistor	⊘	: Resistor
⊞	: Fuse	⊞	: Diode

When using, please read the instruction manual attached to the product carefully and use it properly.

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