

**DEH**

**Manual Operation Instrument**






**OP051-S**

**User Manual**

**IM19H23-E**














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Symbol Definition	
	<b>WARNING:</b> Indicates information that a potentially hazardous situation which, if not avoided, could result in serious injury or death.
	<b>RISK OF ELECTRICAL SHOCK:</b> Indicates information that Potential shock hazard where HAZARDOUS LIVE voltages greater than 30V RMS, 42.4V peak, or 60V DC may be accessible.
	<b>ESD HAZARD:</b> Indicates information that Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices
	<b>ATTENTION:</b> Identifies information that requires special consideration.
	<b>TIP:</b> Identifies advice or hints for the user.

## Security& Caution Symbols

The following table lists Security& Caution symbols used on equipments.

No.	Symbol	Description
1		Direct current (DC)
2		Alternating current (AC)
3		Ground (Earth) terminal
4		Protective earth (ground) terminal
5		Reference ground (Earth) terminal
6		Frame or chassis
7		Equipotentiality
8		On (power)
9		Off (power)
10		Caution, risk of electric shock
11		Caution, hot surface
12		Caution, risk of danger
13		Electrostatic sensitive devices (ESD)

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# Manual Operation Instrument OP051-S

## Section 1 Description

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OP051-S is the manual operation instrument specially used in DEH system, and is set to ensure the safety. OP051-S is connected with DEH speed-measurement module and DEH servo module through the terminal board TU051-S, and can display the feedback value and manual/automatic status of LVDT valve position. It has the manual/automatic switch, over-speed testing switch, increase/decrease button for valve position, manual emergency shutdown button and braking button, etc. When the controller fails, the servo control module and the manual shutdown protection function still can be effective with the manual operation instrument, to ensure the normal operation of the field equipments.

The manual operation instrument is installed in the field operation desk. Its installability and operability are fully considered in structure design, and users can operate it easily. Signals in the manual operation instrument OP051-S include: 2 channels of DI signals, 8 channels of DO signals and 2 channels of AI signals.

OP051-S manual operation instrument can be applied in SUPCON DEH system.

## Section 2 Technical Specifications

Specifications of OP051-S manual operation instrument are shown as Table 2-1.

**Table 2-1 Specifications**

Parameter		Description	
Model		OP051-S	
Power Supply		24VDC±10%	I <sub>max</sub> <300mA
Temperature	Operating Temperature	-20℃~70℃	
	Storage Temperature	-40℃~85℃	
Humidity	Operating Humidity	10%RH~90%RH, No Vapor Condensation	
	Storage Humidity	5%RH~95%RH, No Vapor Condensation	
Signal type	Number of Channel	Index	
AI Analog Input	2 Channels	Voltage Range	24VDC±10%
		Signal Type	(0~20)mA
		Precision	0.5% of the Full Range
		Conversion Speed	400ms in Single Channel
		4-Digit Digital Tube Display	(0~100)% (Corresponding to 0~20 mA)
DO digital output	8 Channels	Output Type	Dry Contact (Normally-open)
		Isolation Voltage	1000VAC, 50Hz, 60s
DI digital input	2 channels	Input Type	Dry Contact (Normally-open)
		OFF resistance	>100kΩ
		ON resistance	<1kΩ

## Section 3 Usage Description

### 3.1 Module Diagram

The panel of OP051-S manual operation instrument is shown as Figure 3-1.

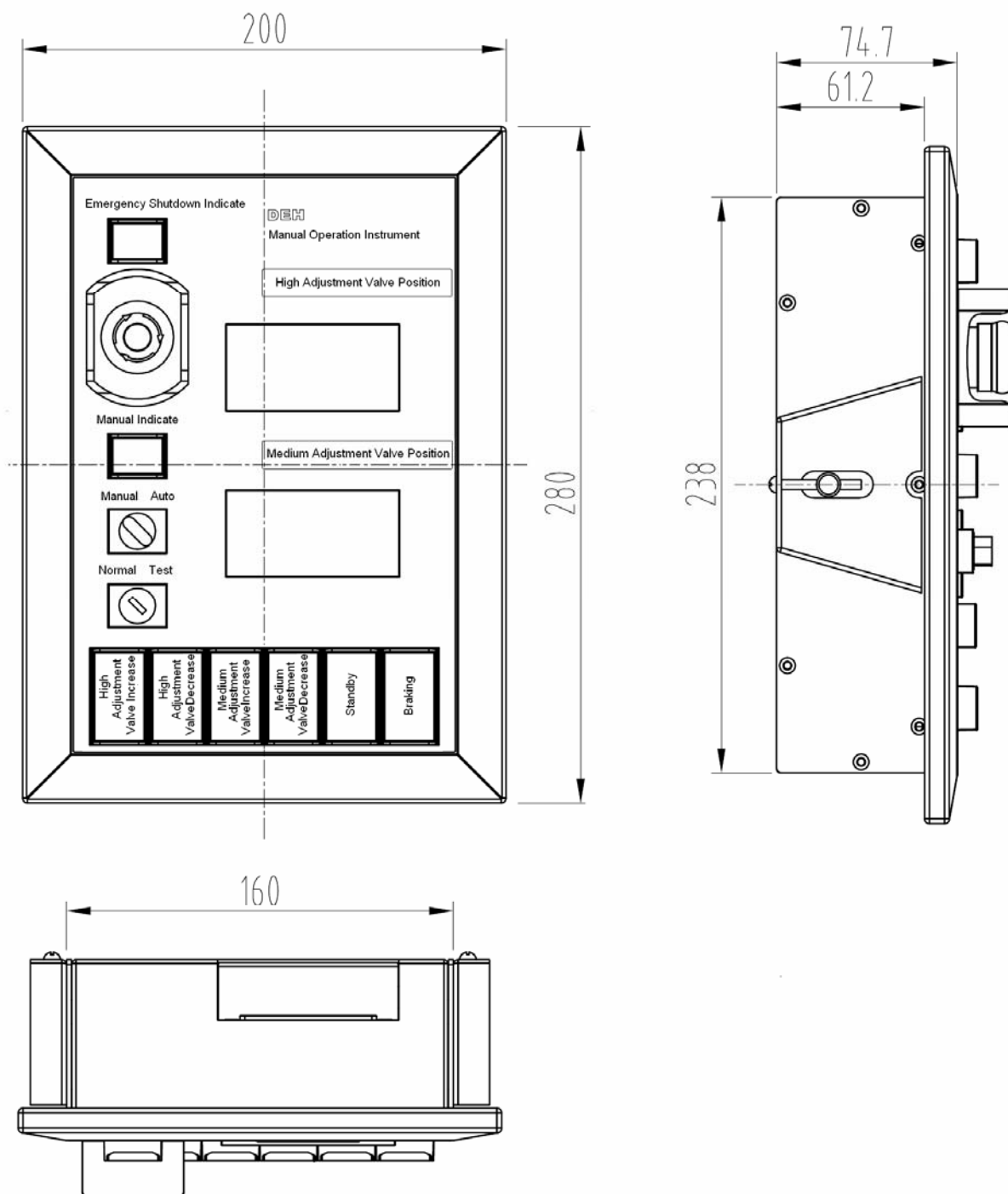


Figure 3-1 Panel and Size of OP051-S

## 3.2 Switches on the Panel

**Table 3-1 Notes for switches on OP051-S panel**

Switch	Switch Type	Function	Channel	Signal Type	Connection
Normal/Test Selection Switch	Key Switch, 90° Key Selection Switch	Valve Test Request Signal	1 Channel	DO, Dry Contact	Speed-measurement Module
Manual Indicate	Yellow, 24V Indicator	Servo Module Manual Feedback Signal Indicate	1 Channel	DI, Indicator Driven by 24V	Servo Module
Auto/Manual Selection Switch	90° Selection Switch	Auto/Manual Request in Servo Module	1 Channel	DO, Dry Contact	Servo Module
High Adjustment Valve Increase	Self -reset Switch, with the 24V Indicator	Load Increase on High Adjustment Valve	1 Channel	DO, Dry Contact	Servo Module
High Adjustment Valve Decrease	Self-reset Switch, with the 24V Indicator	Load Decrease on High Adjustment Valve	1 Channel	DO, Dry Contact	Servo Module
Medium Adjustment Valve Increase	Self-reset Switch, with the 24V Indicator	Load Increase on Medium Adjustment Valve	1 Channel	DO, Dry Contact	Servo Module
Medium Adjustment Valve Decrease	Self-reset Switch, with the 24V Indicator	Load Decrease on Medium Adjustment Valve	1 Channel	DO, Dry Contact	Servo Module
Braking	Self -reset Switch, with the 24V Indicator	Request for Braking Signal	1 Channel	DO, Dry Contact	Standard DI Module
Emergency Shutdown Switch	Self-locking Switch, with the Red 24V Indicator and Protection Shield	Emergency Shutdown Signal	1 Channel	DO, Dry Contact	Speed-measurement Module and Servo Module
Indicator on Emergency Shutdown Switch	Indicator is on the Self-locking Switch for Emergency Shutdown	Feedback of Emergency Shutdown Signal	1 Channel	DI, Indicator Driven by 24V	Standard DO Module
High Adjustment Valve Position	Digital Display Meter	Display of High Adjustment Valve Jaw Opening	1 Channel	AI(0~20)mA	Servo Module
Medium adjustment valve position	Digital Display Meter	Display of Medium Adjustment Valve Jaw Opening	1 Channel	AI(0~20)mA	Servo Module

## 3.3 Switch Status

For notes of switch status, refer to Table 3-2.

**Table 3-2 Notes for Switch Status on OP051-S**

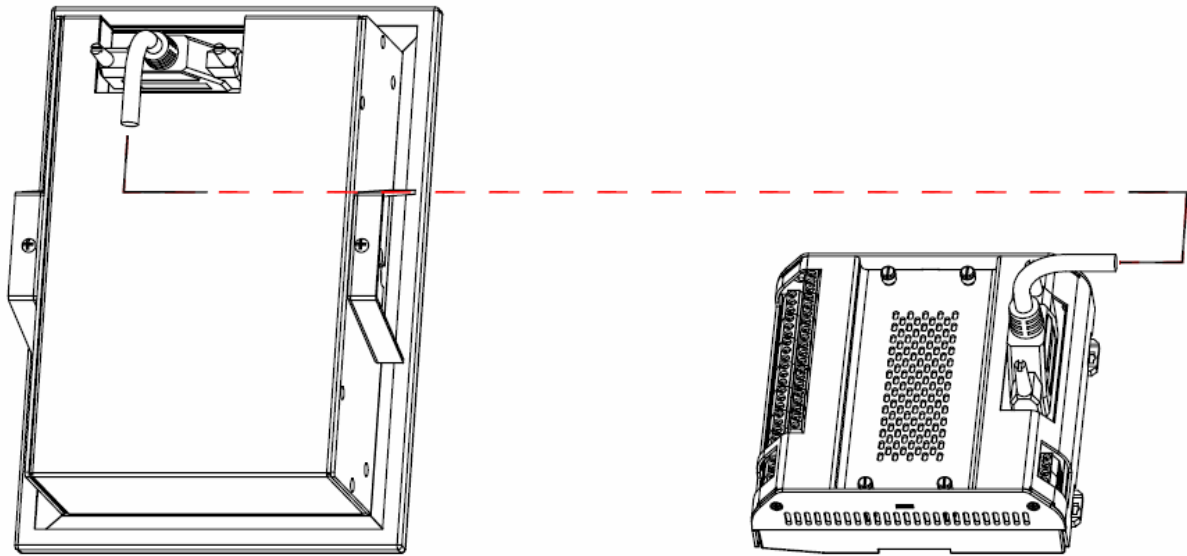
Switch		Status	Description
Normal/test	Key Switch	Normal (OFF Status)	Working Status of DEH
		Test (ON Status)	Test Status of DEH, Used for Test Before Operation
Emergency Shutdown	Button	Press (ON Status)	Output the Emergency Shutdown Signal to Speed-measurement Module and Servo Module in DEH System



Switch		Status	Description
Switch		Bounce (OFF Status)	Module is in the Normal Working Status
	Indicator	ON	This Signal is the Feedback Signal Output from DO Module in DEH System
		OFF	No Feedback Signal Exported from DO Module in DEH System
Manual/Auto Selection Switch		Manual (ON Status)	Send the Manual Request to Servo Module. When Turning to this Position, Servo Module will Accept the Manual Request, to Determine Whether to Switch Depending on the Operation Status.
		Auto (OFF Status)	Servo Module is in the Automatic Status. This Status is the Normal Working Status. Automatic Status Displayed in the Program in Operator Station.
Manual Indicator		ON	It is the Feedback Signal Output from the Servo Module in DEH System
		OFF	No Feedback Signal Output from the Servo Module in DEH System
Self-reset Switch for High Adjustment Valve Increase, High Adjustment Valve Decrease, Medium Adjustment Valve Increase and Medium Adjustment Valve Decrease		Firstly, Set the Amplitude of Increase/Decrease once in Operator Station. Then Press the Corresponding Button: Corresponding Digital Display Meter will Display the Value after Change. Press the Increase Button: Value on Digital Display Meter Increases. Press the Decrease Button: Value on Digital Display Meter Decreases. There is an Indicator on the Button which would be ON Once the Button is Pressed, or it Means the Button is not Pressed Down or has some Problem.	
High Adjustment Valve Position(%) and Medium Adjustment Valve Position		Connect the High Adjustment Valve Servo Module and Medium Adjustment Valve Servo Module Respectively with this Digital Display Meter, and the Display Value is in Percentage from the Larger Selection LVDT Value Output from the Servo Module. It is Based on: The Display Value is Equal to the LVDT Larger Selection Value Displayed on the Operator Station.	

### 3.4 Terminal Connection

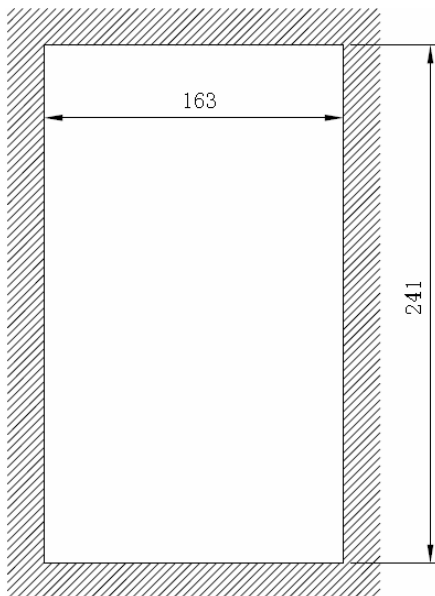
OP051-S manual operation instrument should work with the terminal board TU051-S by DB37 cable, which is shown as follows. Details of TU051-S refer to the *TU051-S User Manual*.



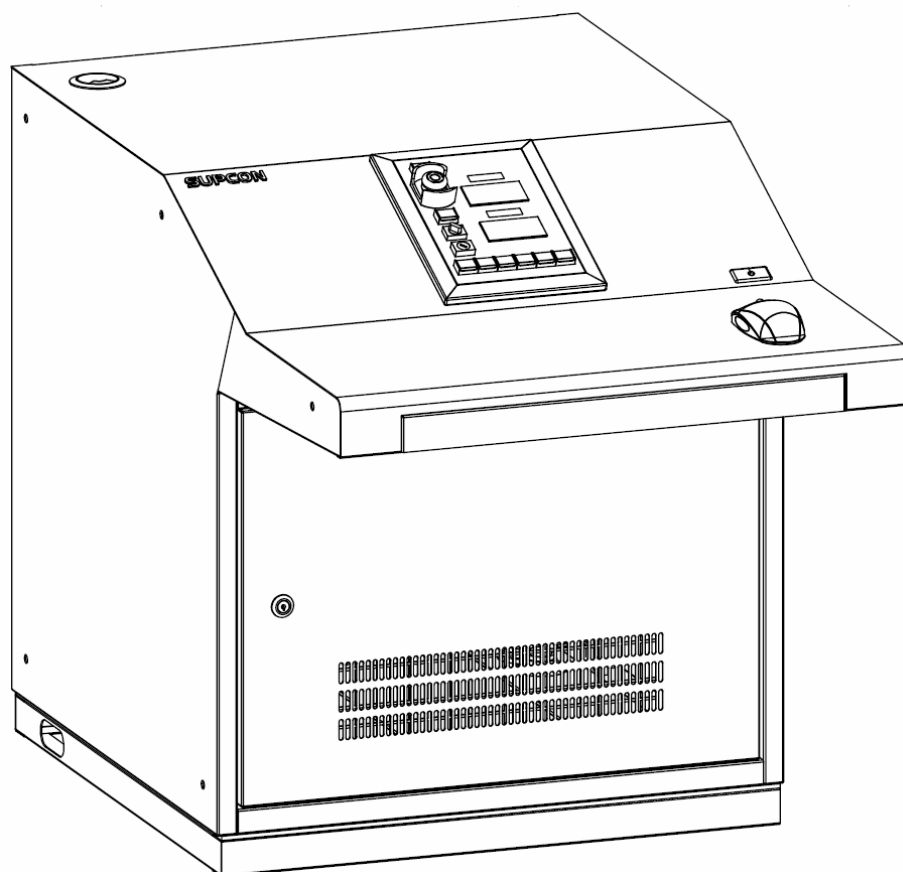
**Figure 3-2 Connection between Manual Operation Instrument and Terminal Board**

### 3.5 Hole Diagram

The hole size and installation of manual operation instrument in operation station is shown as below.



**Figure 3-3 Hole Size**



**Figure 3-4 Installation of Manual Operation Instrument in Operation Station**

## Section 4 Revision

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*Table 4-1 Retrofit list of the version*

Document Version	Applicable Module Version	Remarks
V1.0(20121118)	OP051-S V10.00.00	
V1.1(20161017)	OP051-S V10.00.00	Add notice page and code.
V1.2(20170726)	OP051-S V10.00.00	Modify temperature Modify specifications