TOSHIBA

ADJUSTABLE SPEED DRIVES

S15 (HEAVY DUTY)

LOW VOLTAGE

EXTREME PERFORMANCE MICRO-DRIVE

Toshiba's heavy duty S15 adjustable speed drive is a compact and high performance drive designed for controlling a wide range of variable and constant torque applications for multiple industries. This micro-drive is capable of working with permanent magnet (PM) motors, which allows a much greater flexibility in selecting a motor for an application. In addition, expanded PID control allows a greater level of precise control and operation of difficult level control applications. No other micro-drive delivers such reliable performance and extensive capabilities at such a competitive cost.

Compact Design	Separates the S15 from the competition, as one of the smallest drives offered in the industry. The compact design allows the unit to be installed in areas with limited space, allowing users more real estate when running applications.
Easy Installation and Programming	Allows the user to install and program the S15 drive with minimal downtime. Din Rail kits allow users the option of easily mounting the drive onto a pre-existing DIN inside of a cabinet or on a panel. The addition of the +SU terminal to the S15 allows for the end user to power the drive control section using a simple 24 VDC power supply. This allows startup technicians to program the drive without having to have 230 V, 460 V, or 600 V three-phase power available.
Tough Environment	Conditions are no problem for the S15. Designed to withstand extreme temperatures, the S15 can operate in temperatures of up to 122°F (50°C) without derating and can also be configured for use in temperatures above 122°F (50°C) with a de-rate.
Superior Control	Allows the user ultimate application flexibility. Toshiba's advanced vector-control algorithm offers speed regulation of 0.1% sensor-less. Energy saving, user selectable V/Hz patterns make the S15 a smart choice for any application.
Heavy Duty Performance	Separates the S15 from the competition. Offering one of the toughest micro-drive overload ratings in the industry, the S15 is rated for 110% of its full-load amp rating for continuous operation and 150% for up to one minute.

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ADVANCED FEATURES FOR MAXIMUM DRIVE PERFORMANCE

Built-In LED Interface allows for quick, user-friendly programming and easy modification of the S15's expanded parameter set. Additional remote-mount keypads are also available. The parameter write and simple fault tracking functionality of these optional keypads make setup and troubleshooting quick and simple.

My Function, Toshiba's Proprietary Programming Feature, allows the user to utilize logic-type programming without the expense of a micro PLC. The user is able to read all analog and digital inputs and outputs as well as monitor and compare data. When programmed in a user-defined logic sequence, the use of this data will allow for a higher level of process control not normally seen in an adjustable speed drive. These functions, along with timers, counters, and comparators, allow the S15 to not only meet but exceed performance expectations.

S15's Easy Key is a configurable key that simplifies startup and operation. The easy key quickly accesses commonly changed parameters. In addition, the easy key can also function as a simple local/remote key for easy operation switching.

Improved PID Control Algorithm provides regulation of critical processes. High and low speed limits, deviation limits, online switching, and a built-in sleep function are included to enhance the flexibility and reliability of PID process control. Improved control is possible with the S15's enhanced PID algorithm, making it easier than ever to dial in your process control application.

Toshiba's Proprietary Windows®-Based ASD Pro Software is available at no additional cost. This easy-to-use software is designed to provide a full range of programming and monitoring tools for all Toshiba low voltage drives, including the S15. ASD Pro offers parameter reading, trending, and logging features that allow the user to save and transfer parameters and export data and graphs to an electronic file. Parameter groups and trending data can be easily converted into spreadsheets or graphs for field and validation reports.

COMMUNICATION OPTIONS

The S15 drive offers a wide array of easily installed option boards. These boards allow the user to communicate with a wide variety of systems. Options include:

- CAN Open®
- DeviceNet®
- EtherCAT®
- EtherNet/IP®
- Modbus TCP
- Profibus DP
- PROFINET®

ADDITIONAL OPTIONS

The S15 can be supplied with additional options to expand control, allow greater flexibility, and provide better protection for a user's application. Options include:

- Parameter Writer
- IP54 Packaged Unit (Consult Factory)
- Input Reactor
- DV/dt Long Lead Filter
- NETPAC® Wireless Connection
- Remote Mountable Keypads
- DIN Rail Mounting

OTHER SPECIAL FEATURES

- Safe Torque Off (STO) Compliant
- Ten Year Long-Life Design
- Rotary Encoder
- Reduced Energy Consumption
- UL Listed & Labeled

INDUSTRIES SERVED

- Agribusiness
- Food & Beverage Processing
- HVAC
- Mining & Minerals
- Oil & Gas
- Water & Wastewater

APPLICATIONS

- Blowers & Compressors
- Conveyors
- Fans
- Irrigation
- Lifts
- Machine Tools
- Mixers
- Pumps

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MODEL RANGE	1/4 HP to 3 HP	1/2 HP to 20 HP	1/2 HP to 20 HP	2 HP to 20 HP
Voltage Rating	Single-Phase 230 VAC	Three-Phase 230 VAC	Three-Phase 460 VAC	Three-Phase 600 VAC
POWER REQUIREMENTS				
Input Tolerance	Voltage: ±10%; Frequency: ±5%			
Output Frequency	0.1 to 500 Hz			
CONTROL SPECIFICATIONS				
Control Method	Sinusodial Pulse Width Modulation (PWM); Flux-Field Current Vector Control; Set Point Control (PID)			
Voltage Regulation	Main Circuit Voltage Feedback Control: Automatic, Fixed, & Off			
V/Hz Control	V/f Constant, Variable Torque, Automatic Torque Boost, Vector Control, PM Motor Control, 5-point V/F Custom Setting, & Auto-Tuning			
PWM Carrier Frequency	Adjustable 2 to 16 kHz (For Drive Specific Information Consult Factory)			
Frequency Setting	Rotary Encoder Integrated into EOI, 0 to 10 VDC, ±10VDC, 4 to 20 mA, Digital Input, Binary Input, & Motorized Potentiometer Input			
Frequency Precision	Analog Input ±0.5% of Maximum Output Frequency; Discrete/Communications Input ±0.01% of Maximum Output Frequency			
Speed Regulation	Open Loop: Up to 0.1%, 60:1 Speed Range			
Main Protective Functions	Stall Prevention, Current Limit, Over-Current, Output Short Circuit, Over-Voltage, Over-Voltage Limit, Undervoltage, Ground Fault Detection, Input Phase Failure, Output Phase Failure, Overload Protection by Electronic Thermal Function, Armature Over-Current at Start-Up, Load Side Over-Current at Start-Up, Over-Torque, Undercurrent, Overheating, Cumulative Operation Time, Life Alarm, Emergency Stop, & Various Pre-alarms			
Retry	User-Set Number of Retries for Automatic System Restart After Trip			
Restart	Able to Smoothly Catch Freewheeling Motor (Bidirectional)			
Overload Current Rating	110% Continuous; 150% for One Minute			
CONTROL INTERFACE				
Digital Input	Six Discrete Input Terminals Programmable to 110 Functions (May Be Increased Using Optional Hardware)			
Digital Output	Three Discrete Output Terminals Programmable to 150 Functions; One Form-A Contact, One Form-C Contact, & One Open Collector Output			
Analog Input	Three Programmable: One 4 to 20 mA Input, One 0 to 10 VDC Input, & One ±10 VDC Input			
Analog Output	One Programmable: 4 to 20 mA or 0 to 10 VDC			
Communication Ports	RS485 Port (TSB or MODBUS RTU Protocol)			
ELECTRONIC OPERATOR INTERFACE (EOI)				
Display	Integral Four-Digit & Seven-Segment LED Keypad for Programming, Monitoring, & Diagnostics			
LED Indicator	DC Bus Charge Indicator (Red)			
Keys	Run, Prg, Mon, Status, %, Hz, Stop, Mode, & Easy Key; Rotary Encoder for Parameter Navigation, Settings, & Control			
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Output Frequency, Forward/Reverse Run, Output Current, Input Voltage (DC Detection), Output Voltage, Torque, Inverter Load Factor, Motor Load Factor, Braking Resistor Load Factor, Input Power, Output Power, Input Terminal status, Output Terminal Status, Overload/Regional Setting, PID Feedback Value, Stator Frequency, Parts Replacement Alarm, Cumulative Operation Time, & Past Trips			
CONSTRUCTION				
Enclosure	RAL® 7016 (Anthracite Gray); IP20; Wall-Mount; Front-Access Only			
Power Cables	Bottom Access for Input/Motor Cables			
Cooling	Self-Cooling/ Forced Air-Cooled			
Standards & Compli-ances	UL Listed in US & Canada, CSA® & CE			
AMBIENT CONDITIONS				
Ambient Temperature	−10° to 60°C (Note: See Manual for Details; Ambient Temperatures Above 40°C May Require a De-Rate)			
Altitude	3300 ft. Above Sea Level (Up to 10,000 ft. with De-Rate)			
Humidity	95% Maximum (Non-Condensing)			
Installation	Indoors; No Direct Sunlight; Protects from Corrosive Gas/Explosive Gas/Flammable Gas/Oil Mist/Dust;Vibration of Less Than 5.9 m/s² (10 to 55 Hz)			

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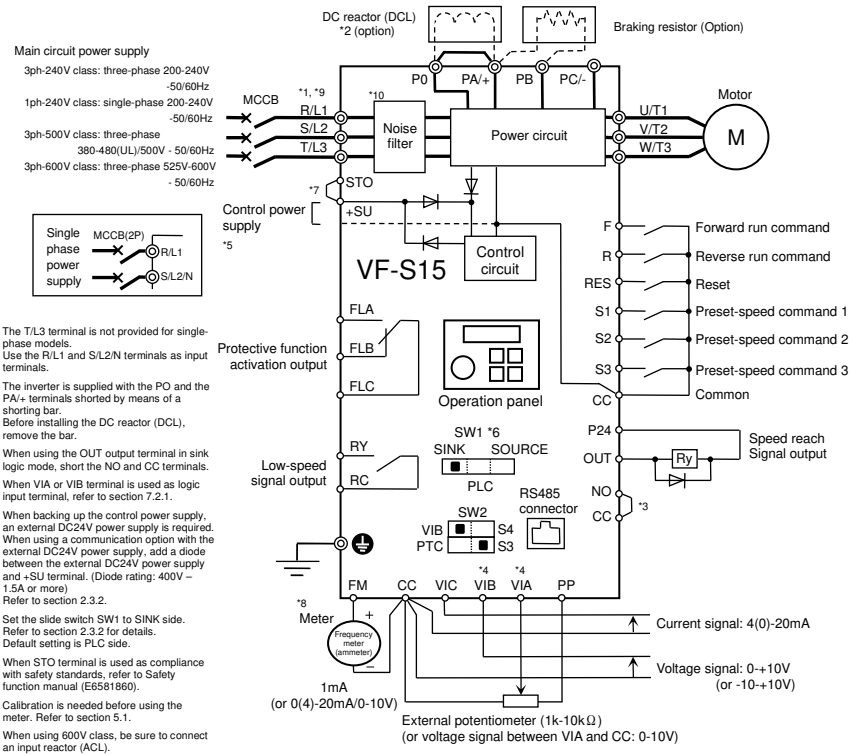
2.2.1 Standard connection diagram 1

This diagram shows a standard wiring of the main circuit.

Standard connection diagram – SINK (Negative) (common: CC)



*1: The T/L3 terminal is not provided for single-phase models.
Use the R/L1 and S/L2/N terminals as input terminals.

*2: The inverter is supplied with the PO and the PA/+ terminals shorted by means of a shorting bar.
Before installing the DC reactor (DCL), remove the bar.

*3: When using the OUT output terminal in sink logic mode, short the NO and CC terminals.

*4: When VIA or VIB terminal is used as logic input terminal, refer to section 7.2.1.

*5: When backing up the control power supply, an external DC24V power supply is required. When using a communication option with the external DC24V power supply, add a diode between the external DC24V power supply and +SU terminal. (Diode rating: 400V – 1.5A or more)
Refer to section 2.3.2.

*6: Set the slide switch SW1 to SINK side.
Refer to section 2.3.2 for details.
Default setting is PLC side.

*7: When STO terminal is used as compliance with safety standards, refer to Safety function manual (E6581860).

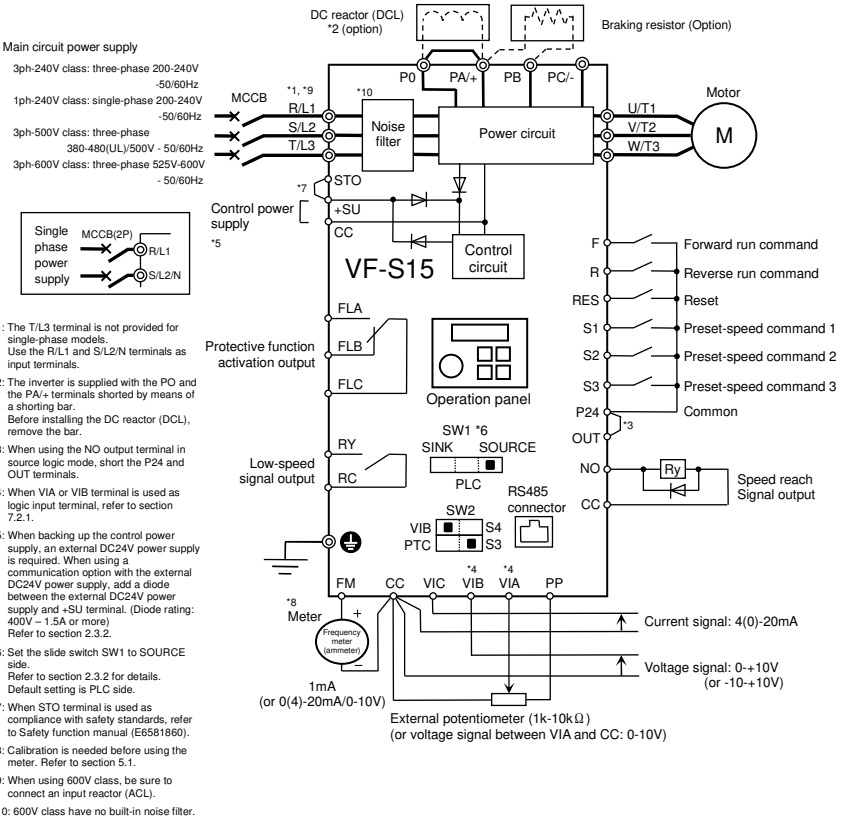
*8: Calibration is needed before using the meter. Refer to section 5.1.

*9: When using 600V class, be sure to connect an input reactor (ACL).

*10: 600V class have no built-in noise filter.

2.2.2 Standard connection diagram 2

Standard connection diagram – SOURCE (Positive) (common: P24)



*1: The T/L3 terminal is not provided for single-phase models.
Use the R/L1 and S/L2/N terminals as input terminals.

*2: The inverter is supplied with the PO and the PA/+ terminals shorted by means of a shorting bar.
Before installing the DC reactor (DCL), remove the bar.

*3: When using the NO output terminal in source logic mode, short the P24 and OUT terminals.

*4: When VIA or VIB terminal is used as logic input terminal, refer to section 7.2.1.

*5: When backing up the control power supply, an external DC24V power supply is required. When using a communication option with the external DC24V power supply, add a diode between the external DC24V power supply and +SU terminal. (Diode rating: 400V – 1.5A or more)
Refer to section 2.3.2.

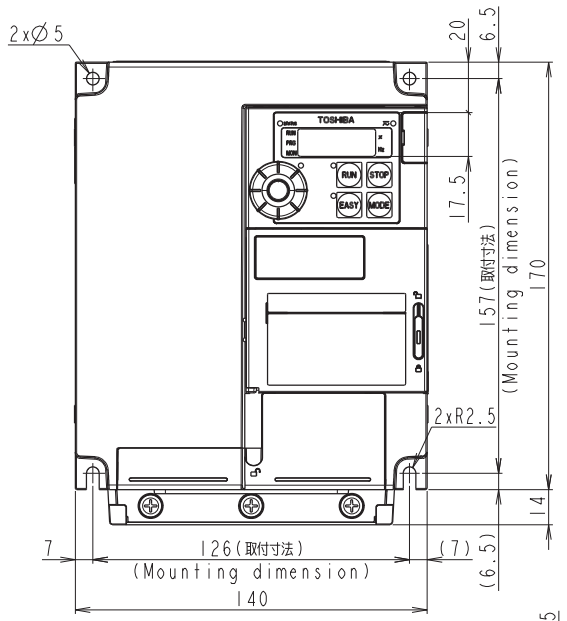
*6: Set the slide switch SW1 to SOURCE side.
Refer to section 2.3.2 for details.
Default setting is PLC side.

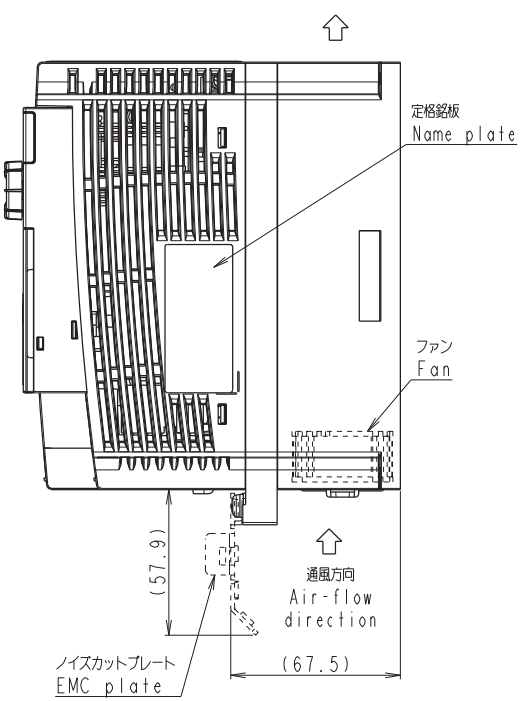
*7: When STO terminal is used as compliance with safety standards, refer to Safety function manual (E6581860).

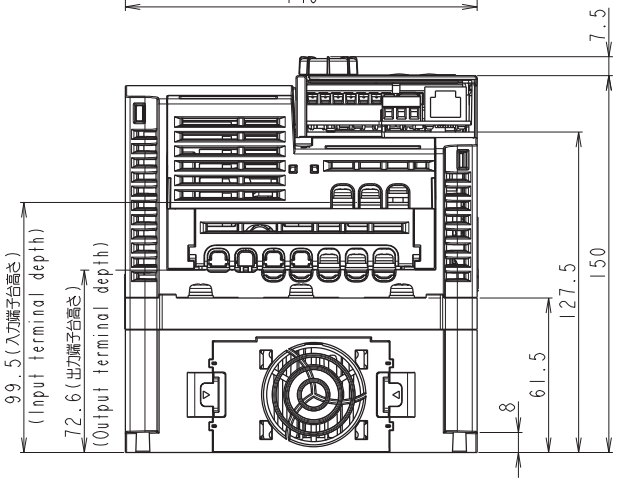
*8: Calibration is needed before using the meter. Refer to section 5.1.

*9: When using 600V class, be sure to connect an input reactor (ACL).

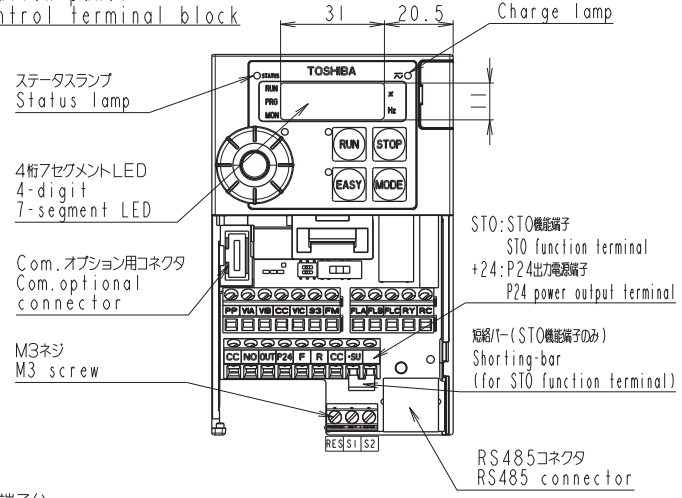
*10: 600V class have no built-in noise filter.



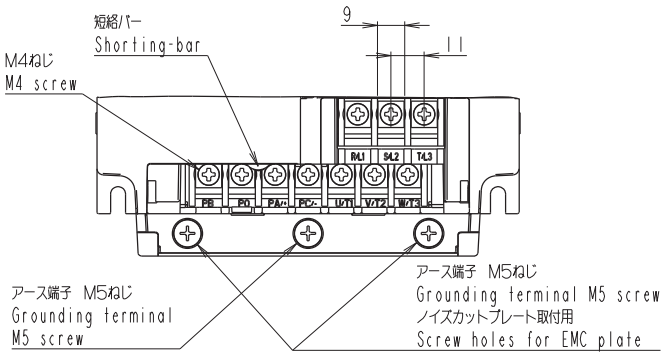




操作パネル / 制御端子台
Operation panel /Control terminal block



主回路端子台
Main circuit terminal block



形式 Model	概略質量(kg) Approx. mass
VFS15-2037PM	2.2

本体色 : グレー RAL7016
Box color : GREY RAL7016

INVERTER	VFS15	2037PM
器具名称 APPARATUS	形 TYPE	式 FORM

記号MARK	年月日DATE	承認APPROVED BY	検図CHECKED BY	名称TITLE
2	6.Aug.2013	K.Furuhashi 8.Feb.2012	S.Fujimori 8.Feb.2012	インバータ外形図 OUTLINE OF INVERTER
1	24.May.2012	設計DESIGNED BY M.Takeuchi 8.Feb.2012	製図DRAWN BY M.Takeuchi 8.Feb.2012	TOSVERT VF-S15 SERIES
	K.Ohta	K.Furuhashi	承認APPROVED BY	
	S.Oi	M.Takeuchi	変更者REVISED BY	
	Add Dimension.	CHG DESCRIPTION	記事CONTENTS	

尺度 SCALE -
単位 UNITS mm
変更 REVISIONS
保管 REGISTERED

TOSHIBA 東芝シュネデール・インバータ株式会社 Toshiba Schneider Inverter Corporation

図面番号 DRAWING NO. M0720909
変更記号 REV.MARK 2
配布先 PRESENT TO

ZZA3MSO PRO