


# Safety System Integration Module

## SI-Safety

	M100	M200	M300	M400	M600	M700
					✓	✓



The SI-Safety module enhances the safety capability of Unidrive M for the protection of end users. The module also increases machine productivity with safety features which reduce the frequency of machine power-downs. Ensuring machines achieve stringent safety standards, SI-Safety can reduce machine size and cost by removing the need for external safety PLCs and other components.

- **Increase productivity:** SI-Safety minimises downtime as its functionality enables a machine to slow-down or stop, removing the need to power-down the machine after interruption.
- **Enhanced user safety:** Features including Safe Stop and Safe Operating Stop dramatically increase end user safety, as well as safe machine operation with Safe Limited Speed and Safe Limited Position.
- **Achieves the highest safety level:** SI-Safety is approved by TUV as meeting SIL3, the highest safety level attainable for industrial electrical components according to functional safety standards as IEC 61800-5-2.

### Standard Safety Functions:

The following SIL3 safety functions defined by IEC 61800-5-2 are available with SI-Safety:

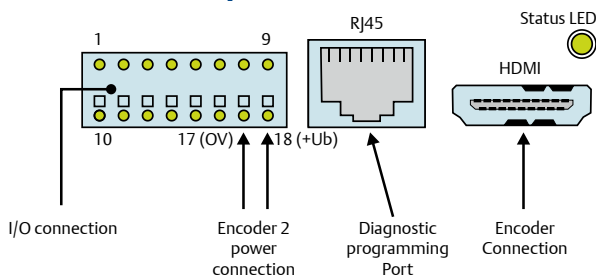
Safe Torque Off	STO	Prevents torque from being generated by the motor. This function is integrated within the drive itself as standard
Safe Stop 1	SS1	Ensures a controlled stop with power available to the motor. Once the stop is achieved the power is then removed.
Safe Stop 2	SS2	Ensures a controlled stop with power left available to the motor
Safe Limited Speed	SLS	Prevents the motor from exceeding a specified speed limit
Safe Limited Position	SLP	Monitors absolute position to ensure the motor operates within specified limits
Safe Brake Control	SBC	Provides a safe output signal to control an external safety brake
Safe Operating Stop	SOS	Prevents the motor from deviating from the stopped position
Safe Direction	SDI	Prevents the motor from moving in the unintended direction
Safe Limited Increment	SLI	Prevents the motor from exceeding the specified limit of position increment
Safe CAM	SCA	Provides a safe signal when the motor position is within a specified range
Safe Speed Monitor	SSM	Provides an indication when the motor speed is below a given limit

## Flexible programming environment

### CTSafePro

CTSafePro unlocks the full safe PLC functionality within the SI-Safety module. It allows users to combine elements to develop their own safety function blocks to meet the specific needs of more advanced applications.

### Terminal descriptions



### Safety Standards

The module is designed to meet the following safety standards:

- IEC and EN 61508: Functional safety of safety-related electric, electronic and programmable electronic systems
- IEC and EN 62061: Safety of machinery, Functional safety of safety-related electrical, electronic and programmable electronic control systems
- ISO and EN ISO 13849-1: Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
- IEC and EN 61800-5-2: Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional

I/O Interface		
Terminal	Designation	Function
1	SMF11	Digital IN SMF11
2	SMF12	Digital IN SMF12
3	SMF21	Digital IN SMF21
4	SMF22	Digital IN SMF22
5	SMF31	Digital IN SMF31
6	SMF32	Digital IN SMF32
7	SMF41	Digital IN SMF41
8	SMF42	Digital IN SMF42
9	E0.5	Digital IN E0.5
10	P1	Clocking output P1
11	P2	Clocking output P2
12	STO	HISIDE output STO
13	SBC1	HISIDE output SBC1
14	SBC2	HISIDE output SBC2
15	A0.1	Signal and auxiliary output A0.1
16	A0.2	Signal and auxiliary output A0.2
17	L-ENC 1/2	Sensor power supply for sensor interface GND ENC 1/2
18	L+ENC2	Sensor power supply for sensor interface SUPPLY ENC2

Encoder interface HDMI			
Pin	Designation	Encoder	Function
1	A+(COS+)/DATA+	ENC1	Incremental track A+ / data wire DATA+
2	SHIELD		
3	A-(COS-)/DATA-	ENC1	Incremental track A- / data wire DATA-
4	B+(SIN+)/CLK+	ENC1	Incremental track B+ / data wire CLOCK+
5	SHIELD		
6	B-(SIN-)/CLK-	ENC1	Incremental track B- / data wire CLOCK-
7	A+(COS+)/DATA+	ENC2	Incremental track A+ / data wire DATA+
8	SHIELD		
9	A-(COS-)/DATA-	ENC2	Incremental track A- / data wire DATA-
10	B+(SIN+)/CLK-	ENC2	Incremental track B+ / data wire CLOCK+
11	SHIELD		
12	B-(SIN)/CLK-		Incremental track B- / data wire CLOCK-
13	L+	ENC1	Power supply for SUPPLY sensor interface
14	L+	ENC1	Power supply for SUPPLY sensor interface
15	L-	ENC1/2	Power supply for GND sensor interface
16	L-	ENC1/2	Power supply for GND sensor interface
17	L+	ENC2	Power supply for SUPPLY sensor interface
18	L+	ENC2	Power supply for SUPPLY sensor interface
19	NC		