

Data sheet SM 022 - Digital output (022-1BF00)

**Technical data** 

TypeSM 022 - Digital outputModule ID0108 AFC8General Information-Features0Box DD224 V 0.5 ACurrent consumption/power loss80 mACurrent consumption from backplane bus80 mAPower loss0.7 WTechnical data digital outputs8Cable length, shielded000 mCable length, shielded000 mCable length, shielded000 mCable length, shielded002 4.4 NPormited rangeDC 244 VPormited rangeDC 24.4 NCurrent consumption from power section supply (without loss)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration, 40°C4 ACurput delay of °1 °1 °1 °1 °2 °59Souring output9Curent per group, vertical configu	Order no.	022-1BF00
General information     Note   -     Features   & SDO DC 24 V 0.5 Å     Current consumption/power loss   80 mA     Current consumption from backplane bus   80 mA     Power loss   0.7 W     Technical data digital outputs   8     Cable length, shielded   1000 m     Cable length, unshielded   600 m     Rated load voltage   DC 24 V     Permited range   DC 24 V     Output gen group, horizontal configuration, 40°C   4 A     Total current per group, horizontal configuration, 60°C   4 A     Output current per group, horizontal configuration   4 A     Output delay of '1' to '1'   30 µs     Output delay of '1' to '1'   30 µs     Output delay of '1' to '0'   175 µs     Minitum load current   -	Туре	SM 022 - Digital output
Note     -       Features     Bx DO Dx 24 V 0.5 Å       Current consumption/power loss     80 mA       Power loss     0.7 W       Technical data digital outputs     8       Cable length, shielded     1000 m       Cable length, shielded     600 m       Ratel Gad Vidage     DC 24 V       Permitted range     DC 24 V       Current per group, horizontal configuration, 40°C     4 A       Total current per group, vortized configuration, 60°C     4 A       Culput current at signal *1*, rated value     0.5 A       Signal logic output     Sourcing output       Output dely of *0* 0*1*     30 µS       Output dely of *0* 0*1*     30 µS       Output dely of *1* 0*0*     not possible       Parallel switching of outputs for increased power     not possible       Parallel switching of outputs for increased power     max 100 Hz       Switching frequency with resistive load     max. 100 Hz       Switchin	Module ID	0106 AFC8
Features BX DD DC 24 V DC 24 V DC 24 V DC 24 V   Current consumption/power loss 80 mA   Power loss 0.7 W <b>Technical data digital outputs</b> 8   Cable length, shielded 1000 m   Cable length, unshielded 600 m   Cable length, unshielded DC 24 V   Permitted fange DC 24 V   Permitted fange DC 2428.8 V   Current consumption from power section supply (without load) 15 mA   Total current per group, horizontal configuration, 40°C 4 A   Output current at signal "1", rated value 0.5 A   Signal logic output Sourcing output   Output daisy of "1" to "0" 175 µs   Minimum load current -   Lamp load 10 W   Parallel switching of outputs for increased power not possible   Actuation of digital input yes   Switching frequency with resistive load max. 100 Hz   Switching frequency with resistive load max. 0.5 Hz   Switching frequency with resistive load max. 0.5 Hz   Switching frequency with resistive load max. 0.5 Hz   Switching frequency with inductive load max. 0.5 Hz   Switching frequency with resistive load max. 0.5 Hz   Switching frequency on lamp lead max. 0.5 Hz	General information	
DC 24 V       Current consumption/power loss       Current consumption from backplane bus     80 mA       Power loss     0.7 W       Technical data digital outputs     8       Number of outputs     8       Cable length, shielded     1000 m       Cable length, unshielded     600 m       Rated load voltage     DC 24 V       Permited range     DC 24 V       Current consumption from power section supply (without load)     15 mA       Total current per group, horizontal configuration, 40°C     4 A       Total current ta signal '1', rated value     0.5 A       Signal logic output     Sourcing output       Output delay of '1' to '0'     175 µs       Minimum load current     -       Lamp load     10 W       Parallel switching of outputs for increased power     not possible       Actuation of digital input     yes       Switching frequency with resistive load     max. 1000 Hz <t< td=""><td>Note</td><td>-</td></t<>	Note	-
Current consumption from backplane bus     80 mA       Power loss     0.7 W       Technical data digital outputs     8       Cable length, shielded     1000 m       Cable length, shielded     600 m       Rated load voltage     DC 24 V       Permitted range     DC 20.428.8 V       Current consumption from power section supply (without load)     15 mA       Total current per group, horizontal configuration, 40°C     4 A       Total current per group, horizontal configuration, 60°C     4 A       Output current at signal *1, rated value     0.5 A       Signal logic output     Sourcing output       Output delay of 1° to *1*     30 µs       Output delay of 1° to *1*     30 µs       Output delay of 1° to *1*     30 µs       Output delay of 1° to *1*     90       Parallel switching of outputs for increased power     not possible       Parallel switching frequency with inductive load     max. 1000 Hz       Switching frequency with resistive load     max. 100 Hz       Switching frequency with resistive load     max. 100 Hz       Switching frequency with resistive load     max. 100 Hz       Switching frequency	Features	DC 24 V
Power loss     0.7 W       Technical data digital outputs     8       Cable length, shielded     1000 m       Cable length, unshielded     600 m       Rated load voltage     DC 24 V       Permitted range     DC 24 V       Current consumption from power section supply (without load)     15 mA       Total current per group, horizontal configuration, 40°C     4 A       Total current per group, vertical configuration, 60°C     4 A       Output current at signal '1', rated value     0.5 A       Signal logic output     Sourcing output       Output day of '1' to '0'     175 µS       Minimum load current     -       Lamp load     10 W       Parallel switching of outputs for redundant control of a load     not possible       Parallel switching of outputs for increased power     not possible       Parallel switching frequency with inductive load     max. 1000 Hz       Switching frequency with inductive load     max. 1000 Hz       Switching frequency with inductive load     max. 100 Hz       Switching frequency on lamp load     max. 10 Hz       Internal limitation of inductive shut-off voltage     L+ (45 V)	Current consumption/power loss	
Technical data digital outputs       Number of outputs     8       Cable length, shielded     1000 m       Cable length, unshielded     600 m       Rated load voltage     DC 24 V       Permitted range     DC 20 428.8 V       Current consumption from power section supply (without load)     15 mA       Total current per group, horizontal configuration, 40°C     4 A       Total current per group, horizontal configuration, 60°C     4 A       Output ourrent at signal '1', rated value     0.5 A       Signal logic output     Sourcing output       Output day of '0' to '1"     30 µs       Output day of '1' to '0"     175 µs       Minimum load current     -       Lamp load     10 W       Parallel switching of outputs for increased power     not possible       Parallel switching requency with inductive load     max. 1000 Hz       Switching frequency with inductive load     max. 100 Hz       Switching frequency with inductive load     max. 100 Hz       Switching requency with inductive load     max. 100 Hz       Switching requency with inductive load     max. 100 Hz       Switching requency with inductive load     <	Current consumption from backplane bus	80 mA
Number of outputs8Cable length, shielded1000 mCable length, unshielded600 mRated load voltageDC 24 VPermitted rangeDC 20.428.8 VCurrent consumption from power section supply (without load)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration, 60°C4 AOutput current per group, vorical configuration4 AOutput current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 µsOutput delay of "1" to "0"175 µsMinimu load current-Lamp load10 WParallel switching of outputs for ricreased powernot possibleActuation of digital inputyesSwitching frequency with nexistive loadmax. 1000 HzSwitching frequency on lamp loadmax. 1000 HzSwitching frequency on lamp loadmax. 1000 HzSwitching rotection of outputs-Switching rotection of outputs-Switching requency of relay outputs-Switching requency of relay outputs-Switching rotection of outputs-Switching requency on lamp load-Internal limitation of inductive shut-off voltage-Lift (45 V)-Short-circuit protection of outputs-Switching requency of relay outputs-Cutput deta size> BitStatus displaygreen LED per channelInternal lim	Power loss	0.7 W
Cable length, shielded1000 mCable length, unshielded600 mRated load voltageDC 24 VPermitted rangeDC 20.428.8 VCurrent consumption from power section supply (without load)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration, 60°C4 ATotal current per group, horizontal configuration4 AOutput current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 µsOutput delay of "1" to "0"175 µsMinimu load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleSwitching frequency with inductive loadmax. 1000 HzSwitching frequency on lamp loadmax. 100 HzSwitching frequency on lamp loadmax. 100 HzSwitching rotection of outputs-Switching rotection of outputs-Switching rotection of outputs-Switching rotection of outputsmax. 10 HzInternal limitation of inductive shut-off voltageL+ (45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output deta size8 BitStatus displaygreen LED per channelInternal limitation of inductives-Trigger levelNomeSwitching requency of relay outputs- <td< td=""><td>Technical data digital outputs</td><td></td></td<>	Technical data digital outputs	
Cable length, unshielded600 mRated load voltageDC 24 VPermitted rangeDC 20.428.8 VCurrent consumption from power section supply (without load)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration, 60°C4 AOutput current at signal *1", rated value0.5 ASignal logic outputSourcing outputOutput delay of *0 * 0*1*30 μsOutput delay of *0 * 0*1*175 μsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with inductive loadmax. 100 HzSwitching frequency on lamp loadmax. 100 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Switching copacity of contacts-Switching capacity of contacts <td>Number of outputs</td> <td>8</td>	Number of outputs	8
Rated load voltage     DC 24 V       Permitted range     DC 20.428.8 V       Current consumption from power section supply (without load)     15 mA       Total current per group, horizontal configuration, 40°C     4 A       Total current per group, horizontal configuration, 60°C     4 A       Total current per group, vertical configuration, 60°C     4 A       Output current at signal "1", rated value     0.5 A       Signal logic output     Sourcing output       Output delay of "0" to "1"     30 µs       Output delay of "1" to "0"     175 µs       Minimu load current     -       Lamp load     10 W       Parallel switching of outputs for redundant control of a load     not possible       Actuation of digital input     yes       Switching frequency with resistive load     max. 1000 Hz       Switching frequency with resistive load     max. 0.5 Hz       Switching frequency with resistive load     max. 0.1 Hz       Internal limitation of inductive shut-off voltage     L+ (45 V)       Short-circuit protection of output     yes, electronic       Trigger level     1 A       Number of operating cycle of relay outputs     -	Cable length, shielded	1000 m
Permitted rangeDC 20.428.8 VCurrent consumption from power section supply (without load)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration4 AOutput current at signal *1*, rated value0.5 ASignal logic outputSourcing outputOutput delay of *0* to *1*30 µsOutput delay of *0* to *1*30 µsOutput delay of *1* to *0*175 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on any load1ANumber of operating cycle of relay outputs-Switching conjucts for contrase-Switching conjuct soft outputs-Switching frequency with inductive loadmax. 100 HzSwitching frequency outputs-Switching frequency outputs-Switching requency outputs-Switching copacity of contacts-Output data size8 BitSta	Cable length, unshielded	600 m
Current consumption from power section supply (without load)15 mATotal current per group, horizontal configuration, 40°C4 ATotal current per group, vertical configuration4 AOutput current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 µsOutput delay of "0" to "1"175 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleSwitching frequency with inductive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 0.5 HzSwitching frequency of outputsyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching contacts-Output data size8 BitStatus displaygreen LED per channel	Rated load voltage	DC 24 V
Total current per group, horizontal configuration, 40°C4 ATotal current per group, horizontal configuration, 60°C4 ATotal current per group, vertical configuration4 AOutput current at signal *1*, rated value0.5 ASignal logic outputSourcing outputOutput delay of *0* to *1*30 µsOutput delay of *0* to *1*75 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with resistive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 0.1 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Permitted range	DC 20.428.8 V
Total current per group, horizontal configuration, 60°C4 ATotal current per group, vertical configuration4 AOutput current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 µsOutput delay of "0" to "1"175 µsMinimun load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency on lamp loadmax. 0.5 HzSwitching frequency on lamp loadmax. 0.1 HzInternal limitation of inductive shut-off voltageL+ (45 V)Short-circuit protection of outputs-Switching copacity of contacts-Output data size8 BitStatus displaygreen LED per channelInternal linitation, alarms, diagnosticsgreen LED per channel	Current consumption from power section supply (without load)	15 mA
Total current per group, vertical configuration4 AOutput current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 μsOutput delay of "1" to "0"175 μsMinimun load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleParallel switching for inputsyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with roll for loadmax. 100 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Status information, alarms, diagnostics8 BitStatus displaygreen LED per channelInterruptsno	Total current per group, horizontal configuration, 40°C	4 A
Output current at signal "1", rated value0.5 ASignal logic outputSourcing outputOutput delay of "0" to "1"30 µsOutput delay of "1" to "0"175 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency on lamp loadmax. 0.5 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Total current per group, horizontal configuration, 60°C	4 A
Signal logic outputSourcing outputOutput delay of "0" to "1"30 μsOutput delay of "1" to "0"175 μsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for redundant control of a loadnot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 0.1 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Total current per group, vertical configuration	4 A
Output delay of "0" to "1"30 µsOutput delay of "1" to "0"175 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency on lamp loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Output current at signal "1", rated value	0.5 A
Output delay of "1" to "0"175 µsMinimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Signal logic output	Sourcing output
Minimum load current-Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInterruptsno	Output delay of "0" to "1"	30 µs
Lamp load10 WParallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInternuptsno	Output delay of "1" to "0"	175 µs
Parallel switching of outputs for redundant control of a loadnot possibleParallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus displaygreen LED per channelInternyltsno	Minimum load current	-
Parallel switching of outputs for increased powernot possibleActuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Lamp load	10 W
Actuation of digital inputyesSwitching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Parallel switching of outputs for redundant control of a load	not possible
Switching frequency with resistive loadmax. 1000 HzSwitching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Parallel switching of outputs for increased power	not possible
Switching frequency with inductive loadmax. 0.5 HzSwitching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Actuation of digital input	yes
Switching frequency on lamp loadmax. 10 HzInternal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsStatus displaygreen LED per channelInterruptsno	Switching frequency with resistive load	max. 1000 Hz
Internal limitation of inductive shut-off voltageL+ (-45 V)Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Switching frequency with inductive load	max. 0.5 Hz
Short-circuit protection of outputyes, electronicTrigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsgreen LED per channelInterruptsno	Switching frequency on lamp load	max. 10 Hz
Trigger level1 ANumber of operating cycle of relay outputs-Switching capacity of contacts-Output data size8 BitStatus information, alarms, diagnosticsStatus displaygreen LED per channelInterruptsno	Internal limitation of inductive shut-off voltage	L+ (-45 V)
Number of operating cycle of relay outputs   -     Switching capacity of contacts   -     Output data size   8 Bit     Status information, alarms, diagnostics   -     Status display   green LED per channel     Interrupts   no	Short-circuit protection of output	yes, electronic
Switching capacity of contacts -   Output data size 8 Bit   Status information, alarms, diagnostics -   Status display green LED per channel   Interrupts no	Trigger level	1 A
Output data size 8 Bit   Status information, alarms, diagnostics   Status display green LED per channel   Interrupts no	Number of operating cycle of relay outputs	-
Status information, alarms, diagnostics   Status display green LED per channel   Interrupts no	Switching capacity of contacts	-
Status display green LED per channel   Interrupts no	Output data size	8 Bit
Interrupts no	Status information, alarms, diagnostics	
·	Status display	green LED per channel
Process alarm no	Interrupts	no
	Process alarm	no

## YASKAWA

Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	green LED
Group error display	red LED
Channel error display	none
Isolation	
Between channels	-
Between channels of groups to	
Between channels and backplane bus	yes
Insulation tested with	DC 500 V
PWM data	
PWM channels	-
PWM time basis	
Period length	
Minimum pulse width	-
Type of output	-
Datasizes	
Input bytes	0
Output bytes	1
Parameter bytes	0
Diagnostic bytes	0
Housing	
Material	PPE / PPE GF10
Mounting	Profile rail 35 mm
Mechanical data	
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm
Net weight	58 g
Weight including accessories	58 g
Gross weight	73 g
Environmental conditions	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
Certifications	
UL certification	yes
KC certification	yes
UKCA certification	yes
ChinaRoHS certification	yes