

Altivar Machine ATV350

Decentralized Variable Speed Drives for Asynchronous and Synchronous Motors

Operating Instructions

Original Instructions written in English

JPT12597.01
01/2026



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Table of Contents

Safety Instructions	5
Basic Safety Instructions	5
Application As Directed	5
Residual Hazards	6
About the book	8
Document description	8
Validity Note	8
Related Documents	9
Notations and conventions	9
General Information.....	12
Product Overview	12
Product Information	13
Product Identification	15
Technical Data.....	16
Standards and Operating Conditions.....	16
Mechanical Installation.....	17
Design/ Mounting Wall	17
Extension box	17
Design/ Mounting Motor	18
Electrical Installation.....	19
Preparation	19
Wiring Diagram	19
Motor Connection	21
3-Phase 400 V.....	22
3-Phase 480 V.....	22
Control Connections	23
PTC Input	24
Networks	24
Commissioning.....	26
Initial Switch-On	26
Important Notes.....	27
ATV350 Drives Manager	27
Quick Commissioning	28
Parameter Overview	28
Favorites.....	29
Troubleshooting	34
Diagnostics	34
Error Codes	35
Status LEDs.....	37
Disposal.....	40
Glossary	41
Index	42

Safety Instructions

Basic Safety Instructions

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never make technical modifications to the product.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- Depending on its degree of protection, the product may have live, movable, or rotating parts during or after operation. Surfaces may be hot.
- Follow all specifications in the supplied documentation. This ensures safe, trouble-free operation and achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel. IEC 60364 and CENELEC HD 384 define the qualifications of such personnel, as follows:
 - They are familiar with installing, mounting, commissioning, and operating the product.
 - They have the corresponding qualifications for their work.
 - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

Please observe the specific safety information in the other sections!

Application As Directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product is exclusively suitable for installation depending on the protection class and design for wall mounting, machine mounting, and for control cabinets.
- The product must only be actuated with motors that are suitable for the operation with drives.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils (IP54/IP66 degree of protection should be **oil proof**), acids and radiation.

Residual Hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for their machine/system.

Failure to follow these instructions may result in personal injury or property damage!

Product

Observe the warning labels on the product



Dangerous electrical voltage:

Before working on the product, make sure there is no voltage applied to the power terminals!

After mains disconnection, the power terminals will still carry the hazardous electrical voltage. For the time given next to the symbol!



Electrostatic sensitive devices:

Before working on the product, the staff must ensure to be free of electrostatic charge!



High leakage current:

Carry out fixed installation and PE connection in compliance with:

EN 61800-5-1 / EN 60204-1



Hot surface:

Use personal protective equipment or wait until the device has cooled down!

Degree of Protection - Protection of Persons and Device Protection

- Information applies to the mounted and ready-for-use state.

Device Protection

- The maximum test voltage for insulation tests between a control potential of 48 V and PE must not exceed 110 V DC (EN 61800-5-1).

Motor Protection

With some settings of the drive, the connected motor can be overheated.

- For example, when operating self-ventilated motors at low speeds for extended periods.
- For example, by longer operation of DC-injection braking.

Protection of the Machine/System

Drives can reach dangerous overspeeds.

- For example, when operating self-ventilated motors at low speeds for extended periods.
- For example, by operating DC-injection braking for extended period.

Motor

If there is a short circuit of two power transistors, a residual movement of up to $180^\circ/\text{number of pole pairs}$ can occur at the motor! (For example, 4-pole motor: residual movement max. $180^\circ/2 = 90^\circ$).

About the book

Document description

This document only includes the most frequently asked questions and presents them in a simplified form for a better overview. Detailed technical and functional explanations can be found in the comprehensive product documentation. The complete documentation, further information and tools regarding Schneider Electric products can be found on the Internet: www.se.com

Validity Note

Original instructions and information given in the present document have been written in English (before optional translation).

This documentation is valid for the Altivar Machine ATV350 drives.

The characteristics of the products described in this document are intended to match the characteristics that are available on www.se.com. As part of our corporate strategy for constant improvement, we may revise the content over time to enhance clarity and accuracy. If you see a difference between the characteristics in this document and the characteristics on www.se.com, consider www.se.com to contain the latest information.

Step	Action
1	Go to the Schneider Electric home page www.se.com .
2	In the Search box type the reference of the product or the name of a product range. • Do not include blank spaces in the reference or product range. • To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the Product Datasheets search results and click on the reference that interests you. If you entered the name of a product range, go to the Product Ranges search results and click on the product range that interests you.
4	If more than one reference appears in the Products search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click Download XXX product datasheet .

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

Related Documents

For certain tasks, information is available in Related Documents.

Title of Documentation	Reference Number
ATV350 Catalog	DIA2ED2251201EN (English); DIA2ED2251201FR (French)
Altivar Machine ATV350 Getting Started (including SCCR)	JPT12596 (English)
Altivar Machine ATV350 Project planning manual	JPT12598 (English)
Altivar Machine ATV350 Commissioning manual	JPT12599 (English)
Altivar Machine ATV350 Operating instructions manual	JPT12597 (English)

More information

For certain tasks, information is available in other media.

Medium	Contents/topics
Altivar ATV350 Drives Manager	For commissioning. You can download here: ATV350-Drives-Manager . When you install Altivar ATV350 Drives Manager, the following software components are installed: - Altivar ATV350 Drives Manager. - Altivar ATV350 Firmware Loader. - Altivar ATV350 Application Loader. - Altivar ATV350 Package Manager (includes firmware and device description).
CAD data	Download in different formats from se.com
EPLAN macros	Project planning, documentation and management of projects for EPLAN P8.

NOTE:

Information and tools with regard to the Schneider Electric products are available at: www.se.com

Notations and conventions

Conventions are used in this document to distinguish between different types of information.

Numeric notation		
Decimal separator	Point	Generally shown as a decimal point. Example: 1 234.56
Warnings		
UL warnings	UL	Are used in English and French.
UR warnings	UR	
Text		
Altivar ATV350 Drives Manager	" "	Software Example: "ATV350 Drives Manager", "ATV350 Firmware Loader"
Icons		

(Continued)

Numeric notation		
Page reference	¶	Reference to another page with additional information. Example: ¶ 16 = see page 16
Documentation reference	,	Reference to other documentation with additional information. Example: , JPTxxx = see documentation JPTxxx

NOTE:

In this document, "ATV350" is used as a wildcard for the "Altivar Machine ATV350" product series.

Layout of the safety instructions

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.

Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

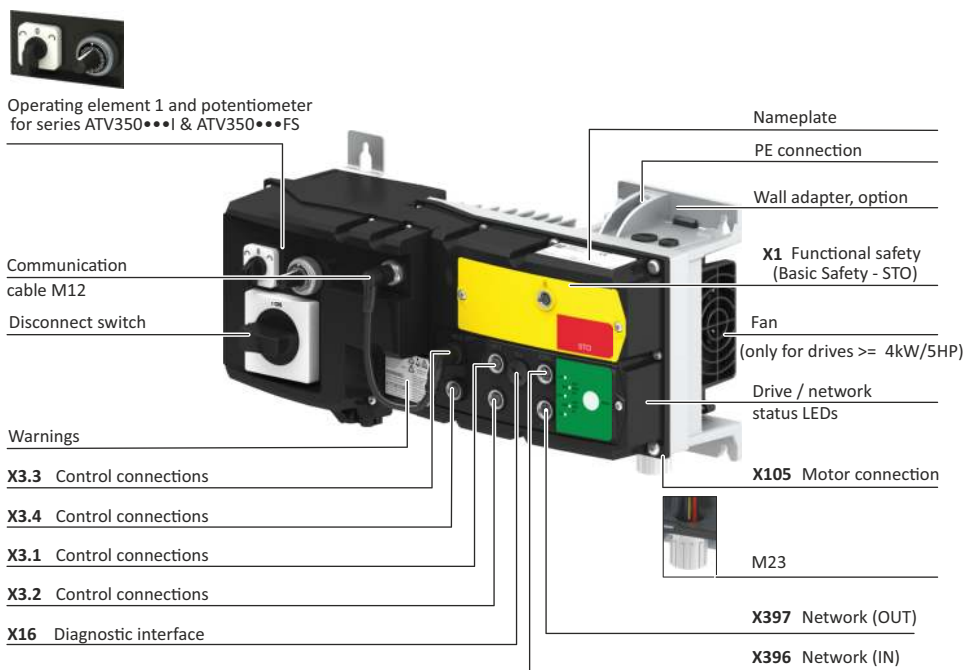
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

General Information

Product Overview

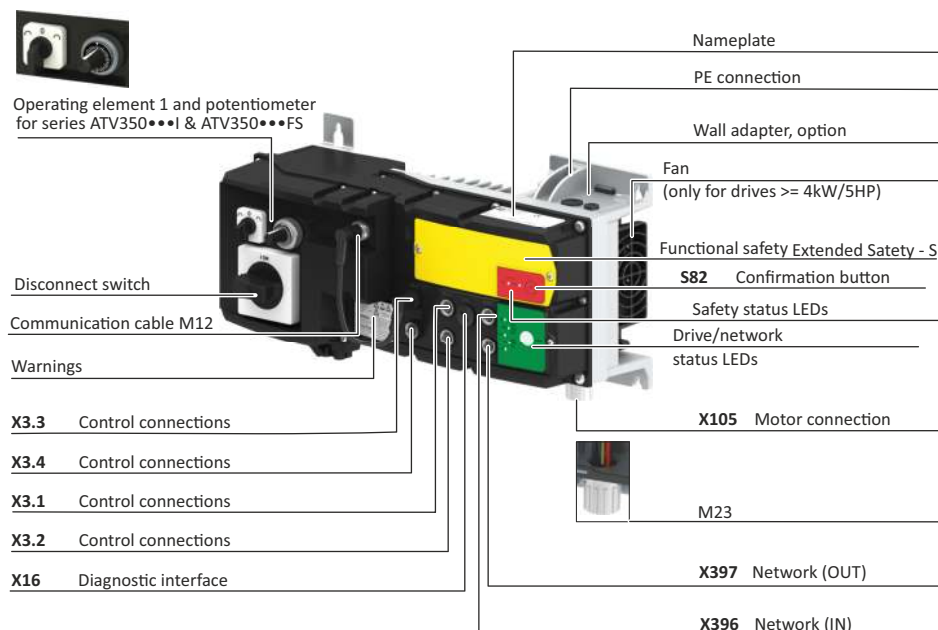
The following figure gives an overview of the elements and connections on the devices. Position, size and appearance of elements and connections may vary depending on the performance and size of the equipment.

Example for Altivar Machine ATV350 with integrated safety technology and extension box with disconnect switch



Control element	Function
Disconnect switch	Mains voltage on/off
Operating element 1	Forward/Reverse/Stop
Operating element 2, lockable	Local control/network control
Potentiometer	Setpoint frequency

Example of Altivar Machine ATV350 with integrated safety function "Extended Safety – S"



Product Information

Please read this documentation carefully before installing the drive, and observe the safety instructions!

This document only includes the most frequently asked questions and presents them in a simplified form for a better overview. Detailed technical and functional explanations can be found in the comprehensive product documentation. The complete documentation, further information and tools regarding Schneider Electric products can be found on the Internet: www.se.com

Application As Directed

- The product is a piece of professional equipment intended for use by trades, specific professions or industry, and not for sale to the general public. IEC 60050 [IEV161-05-05].
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used.
- All transport locks must be removed.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product is exclusively suitable for installation in control cabinets and, depending on the protection class and version, for wall and motor mounting.
- The product may only be operated with motors that are suitable for operation with drives.

- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.

Device-Specific Standards and Directives

- The product meets the protection requirements of the Low-Voltage Directive 2014/35/EU.
- The harmonized standard EN IEC 61800-5-1 is used for the drives. (Europe).
- UL 61800-5-1 and CAN/CSA C22.2 No.274 are the North American electrical safety standards.

Relevant Standards and Directives for the Operator

- If the product is used in accordance with the technical data, the drive systems comply with the EN IEC 61800-3 categories (Category C2 is similar to FCC Class A).
- The test voltage measurement for insulation resistance tests between control potential and PE must be performed in accordance with EN IEC 61800-5-1.
- The cables must be installed in accordance with EN IEC 60204-1 or US National Electrical Code NFPA 70/Canadian Electrical Code C22.1.

Commissioning

- Commissioning or starting the intended operation of a machine with the product is prohibited until it has been ensured that the machine meets the regulations of the Machinery Directive 2006/42/EG and the standard EN IEC 60204-1.
- Commissioning or starting the operation as directed is only permissible if the EMC Directive 2014/30/EU is complied with.
- In residential areas, the product may cause EMC interference. The operator is responsible for executing the interference suppression measures.

License Information PROFINET

The PROFINET firmware is optional. The PROFINET firmware uses the following open source software packages under a modified GPL license: eCos Operating System. These components are used at the operating system level of the firmware. The protocol stack does not use source code under a GPL license.

View license: <https://ecos.sourceware.org/license-overview.html>

Product Identification

Type Code Structure

		ATV	350	D	11	N4	..
Product Range							
ATV	Altivar						
Product Type							
350	Decentralized product						
Power factor							
U	power x 0.1						
D	power x1						
Nominal Power							
07 - 15 - 22 - 40 - 55 - 75 - 11							
Power block							
N4	3 phase 400..480Vac						
Suffix							
W	IP 66, standard interfaces						
I	IP54, Interface expansion : 8 DI/O, IO-Link ports, pulse train in/out, pulse direction, local control						
FS	IP54, Fieldbus safety (functional safety via fieldbus)						
HS	Hardwired safety						

Technical Data

Standards and Operating Conditions

Market approvals		CE (European Union)		Further information and certificates of approval: www.se.com
		UKCA (Great Britain)		
		cULus (USA, Canada)		
Environment		RoHS		
Energy efficiency	High efficiency	EN IEC 61800-9-2	Class IE2	
Degree of protection				Information applies to the mounted and ready-for-use state.
	EN	EN IEC 60529	IP54	Extension box with Type E combination motor controller
				Extension box with disconnect switch and operating elements
			IP66	Drives without extension box
				Extension box with disconnect switch
	UL	UL 50E	Type 12 / 12K	Extension box with Type E combination motor controller
				Extension box with disconnect switch and operating elements
				UL 50E Type 12 / 12K comparable to NEMA 12 / 12K
			Type 4X indoor	Drives without extension box
				Extension box with disconnect switch
				Housing parts UV-resistant (f1 rating)
				UL 50E Type 4X comparable to NEMA 4X
Ambient conditions	Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-30 to +60°C)	Above +40°C: reduce rated output current by 2.5 %/°C
			3C3	For chemically active substances
			3S3	For mechanically active substances
Power systems		TT, TN		Voltage against ground: max. 300 V
Max. motor cable length		Device-specific; see technical data in project planning document		
Max. output frequency		0 Hz to 599 Hz		
Overload capacity		200% for 3s, 150% for 60s		
		3 x 230 V, 18.5 kW and 22 kW: 166% for 3 s, 125% for 60 s		
		3 x 400 V, 37 kW and 45 kW: 166% for 3 s, 125% for 60 s		

Further standards and operating conditions can be found in the Project planning manual.

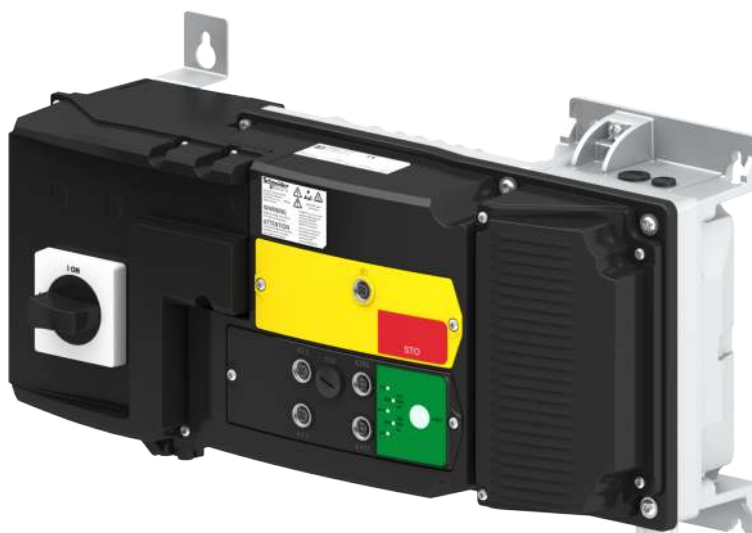
Mechanical Installation

Design/ Mounting Wall

Dimensions and Mounting – Drive for Wall Mounting (without Extension Box)

NOTE: The specified installation clearances are minimum dimensions to ensure sufficient air circulation for cooling purposes. They do not take into account the bend radii of the connecting cables.

Drive	Rated power	Weight	H	B	T	E	E1
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 400/480 V devices							
ATV350U07N4**ATV350U22N4**	0.75 to 2.2	3.2	202	265	128	>50	>100
ATV350U40N4**ATV350U55N4**	4 to 5.5	3.8	202	265	152	>50	>100
ATV350U75N4**ATV350D11N4**	7.5 to 11	6.0	257	358	168	>50	>100



Extension box

Dimensions and Mounting – Drive for Wall Mounting (with Extension Box)

NOTE: The specified installation clearances are minimum dimensions to ensure sufficient air circulation for cooling purposes. They do not take into account the bend radii of the connecting cables.

Drive	Rated power	Weight	H	B	T	E	E1
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 400/480 V devices							
ATV350U07N4**ATV350U22N4**	0.75 to 2.2	4.3	202	400	172	>50	>100
ATV350U40N4**ATV350U55N4**	4 to 5.5	5.0	202	400	196	>50	>100
ATV350U75N4**ATV350D11N4**	7.5 to 11	7.4	257	493	193	>50	>100



Design/ Mounting Motor

Dimensions and Mounting – Drive for Motor Mounting

NOTE: The specified installation clearances are minimum dimensions to ensure sufficient air circulation for cooling purposes. They do not take into account the bend radii of the connecting cables.

Drive	Rated power	Weight	H	B	T	E
	[kW]	[kg]	[mm]	[mm]	[mm]	[mm]
3-phase mains connection 400/480 V devices						
ATV350U07N4••ATV350U22N4••	0.75 to 2.2	2.9	160	265	126	>50
ATV350U40N4••ATV350U55N4••	4 to 5.5	3.4	160	265	140	>50
ATV350U75N4••ATV350D11N4••	7.5 to 11	5.4	211	358	164	>50

Electrical Installation

Preparation

NOTICE

HAZARD OF MOISTURE AND FOREIGN BODY PENETRATION

- All cable glands and mounting parts must at least correspond to the protection class of the drive.
- All openings in the housing must be sealed according to the protection class.
- Device screws must be tightened to the specified tightening torque.
- Reinstall protective caps on unused connectors.

Failure to follow these instructions can result in equipment damage.

NOTICE

For voltage supply with DC 20.5 and 49.9 V, only use a safely separated power supply unit in accordance with the prevailing SELV/PELV requirements.

Failure to follow these instructions can result in equipment damage.

Wiring Diagram

Unintended equipment behavior may occur if connector wiring is incorrect or physically inverted. This can lead to operational hazards and safety risks.

⚠ WARNING

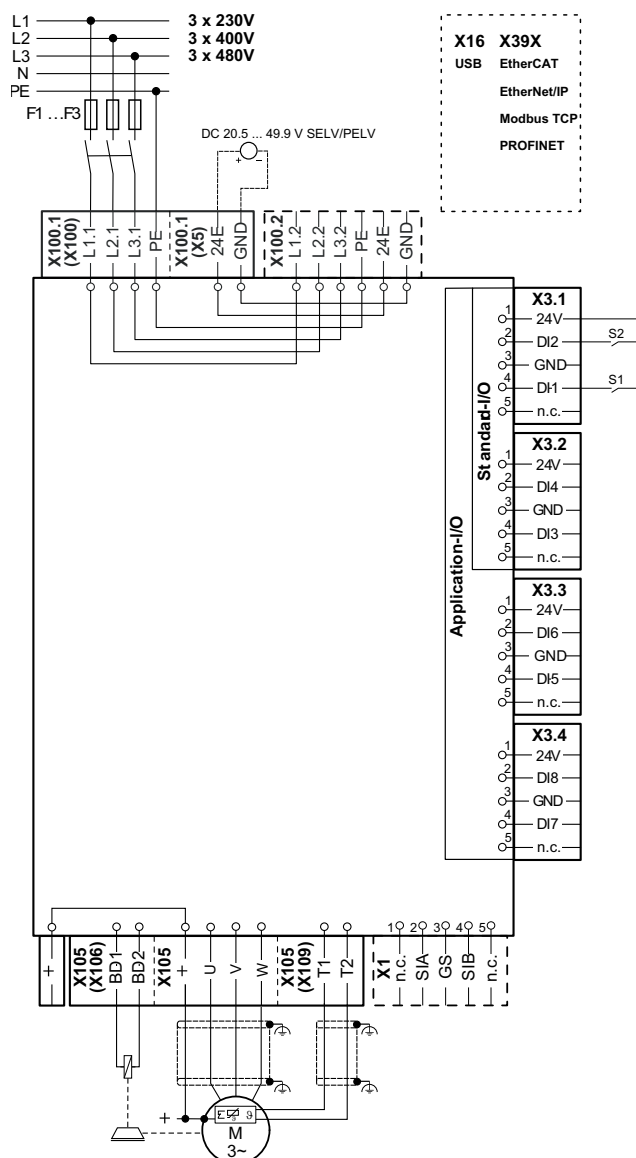
UNANTICIPATED EQUIPMENT OPERATION

- During the initial installation phase, ensure physical identification and labeling of all connectors X3.X.
- After initial wiring and any maintenance operation, perform a full commissioning test to verify correct wiring and connector orientation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The drives are connected directly to the AC mains. RFI filters are already integrated into all drives.

The connection diagram is provided as an example for all voltage and power classes.

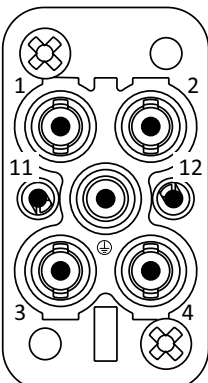
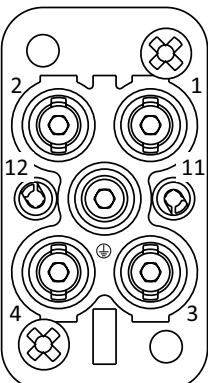


EMC-Compliant Installation

The drive system of drive comply with the EMC Directive 2014/30/EU if they are installed according to the specifications of CE-typical drive systems. These guidelines should also be followed in installations requiring FCC Part 15 or ICES 001 compliance. The structure at the installation location must support the EMC-compliant installation with shielded motor cables.

- Please use sufficiently conductive shield connections.
- Connect the shielded housing to the grounded mounting plate with the largest possible surface area, e.g., for inverters and RFI filters.
- Use central grounding points.

Pin Assignment for Mains Connection

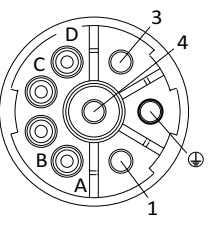
X100.1			X100.2 (daisy chain)		
Han Q4/2 male	Pin	Assignment	Han Q4/2 female	Pin	Assignment
	1	L1.1		1	L1.2
	2	L2.1		2	L2.2
	3	L3.1		3	L3.2
	4	Not assigned		4	Not assigned
		PE			PE
	11	24E		11	24E
	12	GND		12	GND

Mains Connection with Multiple Devices

Several drives in close proximity can be connected to the mains using the integrated Han Q4/2 connectors. The mains cables are looped through from one drive to the next via the Han Q4/2 connector.

Motor Connection

For the motor connection, the drive is equipped with a M23 connector.

ATV350U07N4•• ATV350U11N4•• 0.75 to 11 kW		
X105		
M23 connector		
	Pin	Assignment
		PE
	1	U
	3	V
	4	W
	A	T1
	B	T2
	C	BD1
	D	BD2

3-Phase | 400 V

3-Phase Mains Connection 400 V (340 V to 528 V, 45 Hz to 65 Hz)

Rated data and fusing data

Drive		ATV350						
		U07N4..	U15N4..	U22N4..	U40N4..	U55N4..	U75N4..	D11N4..
Rated power	kW	0.75	1.5	2.2	4	5.5	7.5	11
Rated output current	A	2.4	3.9	5.6	9.5	13	16.5	23.5
Overcurrent cycle 15s ¹								
Max. output current	A	4.8	7.8	11.2	19	26	33	47
Operation without mains choke								
Rated mains current	A	2.2	3.5	5	8.6	11.7	14	20
Fuse (EN 60204-1)/ UL248								
Characteristic	gG/gL or gRL							
Max. rated current	A	30	30	30	30	30	30	30
Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)/ (UL 489)								
Characteristic	B							
Max. rated current	A	20	20	20	20	20	30	30
Max. short-circuit current (SCCR)	kA	42	42	42	42	42	65	65
Residual current device (RCD)	≥30 mA, type B							

¹ Overload time = 3 s, recovery time = 12 s

3-Phase | 480 V

3-Phase Mains Connection 480 V (340 V to 528 V, 45 Hz to 65 Hz)

Rated data and fusing data

Drive		ATV350						
		U07N4..	U15N4..	U22N4..	U40N4..	U55N4..	U75N4..	D11N4..
Rated power	kW	0.75	1.5	2.2	4	5.5	7.5	11
Rated output current	A	2.1	3.5	4.8	8.2	11	14	21
Overcurrent cycle 15s ¹								
Max. output current	A	4.2	7	9.6	16.4	22	28	42
Operation without mains choke								
Rated mains current	A	1.9	3.2	4.3	7.4	9.9	11.9	17.9
Fuse (EN 60204-1)/ UL248								
Characteristic	gG/gL or gRL							
Max. rated current	A	30	30	30	30	30	30	30

Rated data and fusing data (Continued)

Max. short-circuit current (SCCR)	kA	65	65	65	65	65	65	65
Circuit breaker (EN 60204-1)/ (UL 489)								
Characteristic	B							
Max. rated current	A	20	20	20	20	20	30	30
Max. short-circuit current (SCCR)	kA	42	42	42	42	42	65	65
Residual current device (RCD)								

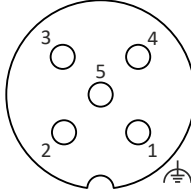
¹Overload time = 3 s, recovery time = 12 s

Control Connections

The functional assignment of the X3.x connectors is configurable.

By default, the connectors are configured as digital inputs (DIx).

- Logic level **HIGH-active** or **LOW-active**, debounce time, and inversion can be parameterized.
- LOW = 0 to +3 V, HIGH = +12 V to +30 V

M12 (A coded)	Pin	X3.1	X3.2	X3.3 *	X3.4 *
	1	24 V	24 V	24 V	24 V
	2	DI2	DI4	DI6	DI8
	3	GND	GND	GND	GND
	4	DI1	DI3	DI5	DI7
	5	Not assigned			
		Housing is connected to functional ground devices with Application-I/O			

* Only available for I, and FS series.

Further configuration options for the connectors can be found in the commissioning manual.

IO-Link

Unintended equipment behavior may occur if connector wiring is incorrect or physically inverted. This can lead to operational hazards and safety risks.

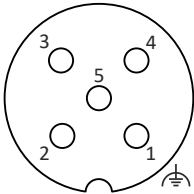
⚠ WARNING
UNANTICIPATED EQUIPMENT OPERATION • During the initial installation phase, ensure physical identification and labeling of all connectors X3.X. • After initial wiring and any maintenance operation, perform a full commissioning test to verify correct wiring and connector orientation. Failure to follow these instructions can result in death, serious injury, or equipment damage.

The drives are connected directly to the AC mains. RFI filters are already integrated into all drives.

Only available for I, and FS series devices.

The drive (IO-Link master) supports IO-Link version 1.1.

For communication with sensors and actuators (IO-Link devices) with port class A, the respective pin 4 of connector X3.x can be configured separately as an IO-Link port:

M12 (A coded)	Pin	X3.1	X3.2	X3.3	X3.4
	1	24 V / L+	24 V / L+	24 V / L+	24 V / L+
	2	DI2	DI4	DI6	DI8
	3	GND / L-	GND / L-	GND / L-	GND / L-
	4	IO-Link Port 1	IO-Link Port 2	IO-Link Port 3	IO-Link Port 4
	5	Not assigned			
		Housing is connected to functional ground			

PTC Input

By default, the motor temperature monitoring is active!

		ATV350U37N4•• 0.37 to 3 kW		ATV350U22N4•• 4 to 22 kW
Connection		X105		X109
Connection type		Han Q8 / M23	Spring terminal	Spring terminal
Max. cable cross-section	mm ²	-	2.5	1.5
Stripping length	mm	-	8	9
Required tools		-	⊖ 0.6 x 3.5	⊖ 0.4 x 2.5
Application	T1	Connection of PTC or thermal contact		
	T2			
Sensor types		PTC single sensor (DIN 44081)		
		PTC triplet sensor (DIN 44082)		
		Thermal contact		
		Notice: The PT1000 temperature sensor is not supported		

NOTICE

If the terminals T1 and T2 are used, For example, to connect an external PTC thermistor or a thermal contact, ensure at least one basic insulation to the potentials of motor, mains and M12 connectors as well as to the auxiliary supply to maintain safe isolation of the M12 connectors.

Failure to follow these instructions can result in equipment damage.

Networks

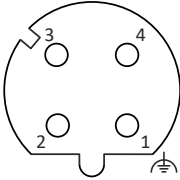
The multi-ethernet interface of the ATV350 drive supports the typical topologies and protocols of the following networks:

- EtherCAT
- EtherNet/IP

- Modbus TCP
- PROFINET

It is possible to switch between the different protocols via parameterization.

The multi-Ethernet interface is designed as an M12 plug connector:

X396 (IN) / X397 (OUT)		
M12 (D coded)	Pin	Assignment
	1	TX+
	2	RX+
	3	TX-
	4	RX-
		Housing is connected to functional ground

Commissioning

Initial Switch-On

Incorrect wiring can cause unexpected states during the commissioning phase.

⚡⚠ DANGER

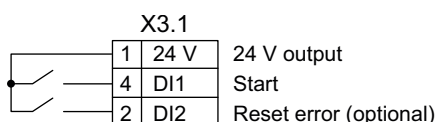
UNEXPECTED STATES DURING COMMISSIONING

- Wiring must be complete and correct.
- Wiring must be free of short circuits and ground fault.
- The motor circuit configuration (star/delta) must be adapted to the drive.
- The motor must be connected in-phase (rotating direction).
- Check the emergency switching off function of the overall system.
- Clear hazardous area.
- Observe safety instructions and safety clearances.

Failure to follow these instructions will result in death or serious injury.

Preconditions:

- The power connections must be wired.
- Connector X3.1 (digital input 1) must be wired.



- The control connections of the safety STO function must be wired.
1. Switch on mains voltage.
 2. Check readiness for operation.
 3. Observe the **DRIVE** LED status display on the front of the drive.

Carry Out Functional Test

Objective: The motor connected to the drive should rotate within the shortest possible time.

Preconditions:

- The connected motor matches the drive in terms of power.
- The parameter settings correspond to the state upon delivery.
- The drive is ready for operation. The mains voltage is switched on.

Start the drive and stop it again:

1. Drive enabled: X1/SIA = HIGH and X1/SIB = HIGH
2. Start drive: X3.1/DI1 = HIGH (switch closed)
 - The drive rotates at 20 Hz.
3. Stop drive again: X3.1/DI1 = LOW (switch open)

Important Notes

Incorrect settings during commissioning may cause unexpected and dangerous motor and system movements.

⚠ WARNING

UNEXPECTED AND DANGEROUS MOTOR AND SYSTEM MOVEMENTS

- Clear hazardous area.
- Observe safety instructions and safety clearances.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Diagnostic Interface X16 (USB Interface)

The drive has a built-in USB port (USB-C).

- The USB port may only be used temporarily for the diagnostics and parameterization of the drive. We recommend keeping the drive and diagnostics device on the same ground potential or disconnecting the diagnostics device from the mains.
- Parameter setting without motor operation does not require a mains voltage. If you connect the drive directly to the PC without a hub, the USB interface of the PC is sufficient for the voltage supply.

ATV350 Drives Manager

Engineering Tool- ATV350 Drives Manager

Commissioning and diagnostics are performed via the ATV350 Drives Manager Engineering Tool.

[Download ATV350 Drives Manager](#)

Establish Connection between the Drive and ATV350 Drives Manager

Preconditions for commissioning:

- The functional test has been completed successfully (without any errors).
- The drive is ready for operation. The mains power is switched on.

Accessories required for commissioning:

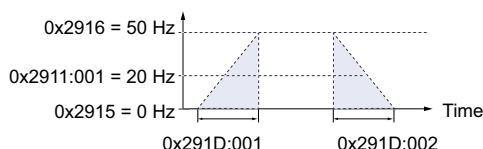
- USB cable with USB-C connector
 - PC with installed ATV350 Drives Manager software
1. Insert the USB-C plug of the USB cable into the USB socket of the drive.
 2. Plug the other end into a free USB socket on the PC.
 3. Start ATV350 Drives Manager. The **Add devices** dialog appears.
 4. Select the **USB on Board** connection.
 5. Click the **Insert** button.

ATV350 Drives Manager searches for connected devices via the communication path selected. When the connection has been established successfully, the drive

appears in the device list of ATV350 Drives Manager. The drive parameters can now be accessed via the tabs of ATV350 Drives Manager.

Quick Commissioning

1. Load default setting: 0x2022:001 = **on / start [1]**
2. Set the following parameters for V/f characteristic control:
 - 0x2540:001: Mains voltage
 - 0x2B01:001: V/f characteristic data: Base voltage
 - 0x2B01:002: V/f characteristic data: Base frequency
 - 0x2915: Minimum frequency
 - 0x2916: Maximum frequency
 - 0x291D:001: Acceleration time 1
 - 0x291D:002: Deceleration time 1
 - 0x2911:001: Setpoint frequency preset 1



3. Save settings: 0x2022:003 = **on / start [1]**

Start drive:

- Drive enabled: X1/SIA = HIGH and X1/SIB = HIGH
- Start drive: X3.1/DI1 = HIGH
- The drive rotates with setpoint frequency preset 1 (0x2911:001)

Stop drive again: X3.1/DI1 = LOW

Parameter Overview

The most important parameters at a glance

This section contains the most important parameters and selections.

You can find a detailed description in the [ATV350 Commissioning Manual](#)

Parameter list

In the ATV350 Drives Manager you have access to all available parameters of the inverter via the **Parameter list** tab.

The parameters are divided into the following function groups in the parameter list:

- Group 0 - favorites
- Group 1 - diagnostics
- Group 2 - basic setting
- Group 3 - motor control
- Group 4 - I/O setting
- Group 5 - network setting
- Group 6 - process controller
- Group 7 - additional functions

Favorites

Group 0 - Favorites

Group 0 contains the configurable favorites that are also contained in Groups 1 to 4. By default, these are the most common parameters used to solve typical applications.

Index	Name	Possible settings/value ranges	Selection no.	Information
0x2DDD	Output frequency	x.x Hz (read only)		Displays the actual output frequency.
0x6078	Actual current	x.x % (read only)		Displays the actual motor current.
0x2D89	Motor voltage	x VAC (read only)		Displays the current motor voltage.
0x603 F	Error code	- (read only)		Error message.
0x2860:001	Frequency control: Standard setpoint source	Network	[5]	The setpoint is defined as process data object via the network.
		Frequency preset 1 to 15	[11] to [25]	For the setpoint selection, preset values can be parameterized and selected. All frequency presets are described in detail in the commissioning manual.
0x2838:001	Start method	Standard	[0]	After start command, the standard ramps are active.
		DC braking	[1]	After start command, the DC braking function is active for the time set in 0x2B84:002.
0x2838:003	Stop method	Coasting	[0]	The motor has no torque (coasts down to standstill).
		Standard ramp	[1]	The motor is brought to a standstill with deceleration time 1 (0x291D:002) or - if activated - with deceleration time 2 (0x291D:004).
		Quick stop ramp	[2]	The motor is brought to a standstill with the deceleration time (0x291C) set for the Quick stop function.
0x2540:001	Rated mains voltage	230 Veff	[0]	Selection of the mains voltage for actuating the drive.
		400 Veff	[1]	
		480 Veff	[2]	
0x2915	Minimum frequency	0.0 to 599.0 Hz		Lower limit value for all frequency setpoints.
0x2916	Maximum frequency	0.0 to 50.0 to 599.0 Hz		Upper limit value for all frequency setpoints.
0x291D:001	Acceleration 1	0.0 to 5.0 to 3600.0 s		Acceleration time 1.
0x291D:002	Deceleration 1	0.0 to 5.0 to 3600.0 s		Deceleration time 1
0x2C00	Motor control type	Servo control (SC ASM)	[2]	This control mode is used for servo control of an asynchronous motor.
		Sensorless vector control (SLVC)	[4]	This control mode is used for sensorless vector control of an asynchronous motor.
		V/f characteristic control VFC open loop	[6]	This control mode is used for the speed control of an asynchronous motor via a V/f characteristic and is the simplest control mode.
		V/f characteristic control (VFC closed loop)	[7]	The control mode is used for speed control of an asynchronous motor via a V/f characteristic with speed feedback.
		Sensorless control (SLSM-PSM)	[8]	This control mode is used for the sensorless control of a synchronous motor.
0x2B00	V/f characteristic shape	Linear	[0]	Linear characteristic for drives with constant load torque over the speed.

Index	Name	Possible settings/value ranges	Selection no.	Information
		Square-law	[1]	Square-law characteristic for drives with a square-law load torque over the speed.
		Eco	[3]	Linear characteristic with energy optimization in the partial load operational range.
0x2B01:001	Base voltage	0 to 400 to 5000 V *		Base voltage and base frequency define the V/f ratio and thus the gradient of the V/f characteristic.
0x2B01:002	Base frequency	0 to 50 to 1500 Hz		– The V/f base voltage is usually set to the rated motor voltage. – The V/f base frequency is usually set to the rated motor frequency.
0x283A	Limitation of rotation	Only clockwise (CW)	[0]	The motor can only rotate clockwise (CW). The transfer of negative frequency and PID setpoints to the motor control is prevented.
		Both rotating directions	[1]	Both directions of motor rotation are enabled.
0x2939	Switching frequency	*	[*]	Selection of the drive switching frequency.
0x2D4B:001	Maximum utilization [60 s]	30 to 150 to 200 %		Maximum permissible thermal motor utilization (max. permissible motor current for 60 seconds). With regard to rated motor current (0x6075).
0x2B12:001	Fixed boost	0.0 to 2.5 to 20.0 % *		Constant voltage boost for the V/f characteristic control without feedback.
0x6075	Rated motor current	0.001 to 1,420 to 500.000 A *		Setting of the rated motor current according to motor nameplate.
0x6073	Max. current	0.0 to 200.0 to 3000.0 %		Maximum overload current of the drive. With regard to rated motor current (0x6075).
0x2631:001	Drive enable	Constant TRUE	[1]	Assignment of a trigger to the drive enable function. Trigger = TRUE: The drive is enabled (unless there is another cause for drive disable). Trigger = FALSE: The drive is disabled. The motor has no torque and coasts.
0x2631:002	Start	Digital input 1	[11]	Assignment of a trigger to the Run function. Function 1: Start/stop motor (default setting) Function 1 is active when no network control is active. Trigger = TRUE: Let motor rotate forward (CW). Trigger = FALSE: Stop motor according to stop method (0x2838:003).
				Function 2: Start enable/stop motor Function 2 is active when network control is active. Trigger = TRUE: Start commands of the active control source are enabled. Trigger = FALSE: Stop motor.
0x2631:003	Activate quick stop	Not connected	[0]	Assignment of a trigger to the Activate quick stop function. Trigger = TRUE: Activate quick stop. Quick stop ramp adjustable in 0x291C. Trigger = FALSE: Deactivate quick stop
0x2631:004	Reset error	Digital input 2	[12]	Assignment of a trigger to the Reset error function.

Index	Name	Possible settings/value ranges	Selection no.	Information
				Trigger = FALSE > TRUE (edge): Active error is reset (acknowledged) if the error condition is not active anymore and the error is resettable. Trigger = FALSE: No action.
0x2631:005	Activate DC braking	Not connected	[0]	Assignment of a trigger to the Activate DC braking function. Trigger = TRUE: Activate DC braking. Trigger = FALSE: Deactivate DC braking.
0x2631:006	Start forward	Not connected	[0]	Assignment of a trigger to the Start forward (CW) function. Trigger = FALSE > TRUE (edge): Let motor rotate forward. Trigger = TRUE > FALSE (edge): No action. To stop the motor, set function Start to FALSE (0x2631:002, default digital input 1).
0x2631:007	Start reverse	Not connected	[0]	Assignment of a trigger to the Start reverse (CCW) function. Trigger = FALSE > TRUE (edge): Let motor rotate backward. Trigger = TRUE > FALSE (edge): No action. To stop the motor, set function Start to FALSE (0x2631:002, default digital input 1).
0x2631:008	Run forward	Not connected	[0]	Assignment of a trigger to the Run forward (CW) function. Trigger = TRUE: Let motor rotate forward. Trigger = FALSE: Stop motor.
0x2631:009	Run reverse	Not connected	[0]	Assignment of a trigger to the Run reverse (CCW) function. Trigger = TRUE: Let motor rotate backward. Trigger = FALSE: Stop motor.
0x2631:013	Reverse rotating direction	Not connected	[0]	Assignment of a trigger to the Reverse rotating direction function. Trigger = TRUE: The setpoint specified is inverted (i.e. the sign is inverted). Trigger = FALSE: No action/deactivate function again.
0x2631:018	Activate preset (bit 0)	Not connected	[0]	Assignment of a trigger to the Activate preset (bit 0) function. Bit with the valency 2 ⁰ for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = 0. Trigger = TRUE: Bit = 1.
0x2631:019	Activate preset (bit 1)	Not connected	[0]	Assignment of a trigger to the Activate preset (bit 1) function. Bit with the valency 2 ¹ for the bit-coded selection and activation of a parameterized setpoint (preset value). Trigger = FALSE: Bit = 0. Trigger = TRUE: Bit = 1.
0x2631:020	Activate preset (bit 2)	Not connected	[0]	Assignment of a trigger to the Activate preset (bit 2) function. Bit with the valency 2 ² for the bit-coded selection and activation of a parameterized

Index	Name	Possible settings/value ranges	Selection no.	Information
				setpoint (preset value). Trigger = FALSE: Bit = 0. Trigger = TRUE: Bit = 1.
0x2634:002	Digital output 1	Operation enabled	[52]	Assignment of a trigger to digital output 1. Trigger = FALSE: X3.1/DO1 set to LOW level. Trigger = TRUE: X3.1/DO1 set to HIGH level.
0x2911:001	Setpoint frequency presets: Preset value 1	0.0 to 20.0 to 599.0 Hz		Parameterizable frequency setpoints
0x2911:002	Setpoint frequency presets: Preset value 2	0.0 to 40.0 to 599.0 Hz		
0x2911:003	Setpoint frequency presets: Preset value 3	0.0 to 50.0 to 599.0 Hz		
0x2911:004	Setpoint frequency presets: Preset value 4	0.0 to 0.0 to 599.0 Hz		

* Default setting dependent on the size

Group 2 - Basic Setting

Index	Name	Possible settings	Selection no.	Information
0x291C	Quick stop ramp	0.0 to 1.0 to 3600.0 s		Quick stop ramp for MS: Velocity mode . – If the Quick stop function is activated, the motor is brought to a standstill within the deceleration time set here. – The set braking deceleration time refers to the braking deceleration starting from the set maximum frequency (0x2916) to standstill. In the case of a lower actual frequency, the actual deceleration time is reduced accordingly. – Setting is not effective in the operating mode 0x6060 = CiA: Velocity mode [2] .

Group 3 - Motor Control

Index	Name	Possible settings	Selection no.	Information
0x2C01:004	Motor parameter: Rated speed	50 to 1450 to 50000 rpm		General motor data. Carry out settings as specified by motor nameplate data. Important! When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the connection type selected.
0x2C01:005	Motor parameter: Rated frequency	1.0 to 50.0 to 10000.0 Hz		
0x2C01:006	Motor parameter: Rated power	0.00 to 0.25 to 655.35 kW 0.00 to 0.33 to 878.84 hp		
0x2C01:007	Motor parameter: Rated voltage	0 to 230 to 65535 V		
0x2C01:008	Motor parameter: Cosine phi	0.00 to 0.80 to 1.00		

Group 7 - Additional Functions

Index	Name	Possible settings	Selection no.	Information
0x2022:001	Device commands: Load default settings	On / start	[1]	1 = reset all parameters in the RAM memory of the drive to the default setting stored in the drive firmware. – All parameter changes made by the user are lost during this process! – This process may take several seconds. When the device command has been executed successfully, the value 0 is shown. – Loading parameters has a direct effect on cyclic communication: The data exchange for control is interrupted and a communication error is generated.
		Off/ready	[0]	Only status feedback
0x2022:002	Device commands: Save user data	On / start	[1]	1 = save current parameter settings in the drive with mains failure protection. – This process may take several seconds. When the device command has been executed successfully, the value 0 is shown. – Do not switch off the supply voltage during the saving process!
		Off/ready	[0]	Only status feedback

Troubleshooting

Diagnostics

The drive provides many diagnostic parameters which are helpful for operation, maintenance, error diagnosis, error correction, etc.

In the ATV350 Drives Manager you have access to the diagnostic parameters of the drive via the **Diagnostics** tab.

Reset Error via ATV350 Drives Manager

Errors can be reset with the **Reset** button (**Diagnostics** tab).

- Condition: Cause of error has been eliminated and no blocking time is active.

Reset Error via Control Connections

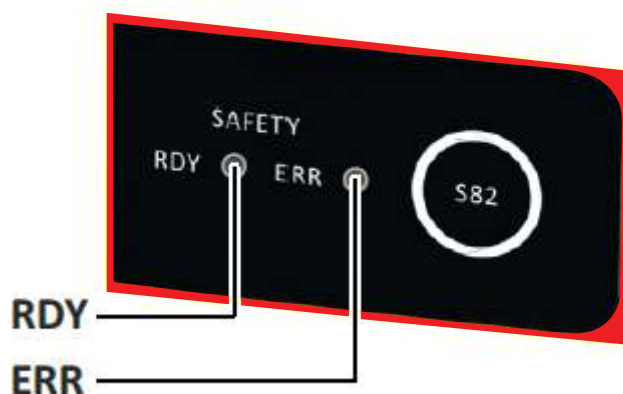
Errors can be reset in two ways via the control connections:

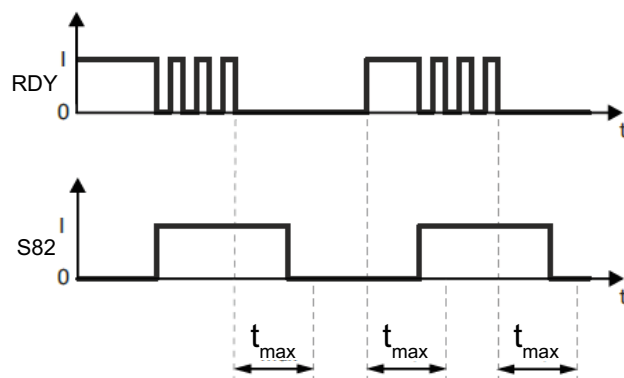
1. Via start signal (0x2631:002, default digital input 1).
 - Condition: Cause of error has been eliminated and no blocking time is active.
 - The signal at the digital input 1 must drop and then be applied again.
2. Via error reset signal (0x2631:004, default digital input 2).
 - Condition: Cause of error has been eliminated and no blocking time is active.
 - The error is reset if a signal is applied to digital input 2.

Extended Safety: Acknowledgment with Confirmation Button S82

If the device detects a modified parameter set or a changed safety address during initialization, the device requests an acknowledgment with confirmation button S82: The safety LED **RDY** (yellow) is on and the safety LED **ERR** (red) flashes.

To acknowledge the request with the S82 confirmation button:





NOTE: The acknowledgment procedure is aborted if the maximum response time of 2.5 seconds is exceeded. The acknowledgment procedure must be repeated.

1. Press and hold the **S82** button.
 - The **RDY** LED flashes.
2. The **RDY** LED goes off after 3 seconds.
3. Release the **S82** button after a maximum of 2.5 seconds.
 - The **RDY** LED is lit.
4. Press and hold the **S82** button after a maximum of 2.5 seconds.
 - The **RDY** LED flashes.
5. The **RDY** LED goes off after 3 seconds.
6. Release the **S82** button after a maximum of 2.5 seconds.
 - The acknowledgment is successfully completed.
 - The action is recorded in the drive logbook.
7. Use a function test to ensure that the acknowledgment has led to the correct result.

Error Codes

Error code	Description	Classification	Remedy	Blocking time [s]
2250	CiA: Continuous overcurrent (inside the device)	Error	– Check motor and wiring for short circuits. – Check brake resistor and wiring. – Check motor circuit (delta connection, star connection). – Check setting of the motor data.	5
2320	Short circuit or ground leakage on motor side	Error	– Check motor cable. – Check the length of the motor cable. – Use shorter or lower-capacitance motor cable.	5
2340	CiA: Short circuit (inside the device)	Error	– Check motor cable for short circuit.	5
2350	CiA: $i^2 \cdot t$ overload (thermal state)	Error	– Check drive sizing. – Check machine/driven mechanics for excessive load. – Check setting of the motor data. – Reduce values for slip compensation (0x2B09:001, 0x2B09:002) and oscillation damping (0x2B0A:001, 0x2B0A:002).	5
2382	Error - device utilization (Ixt) too high	Error	– Check drive sizing.	3

Error code	Description	Classification	Remedy	Blocking time [s]
			– Reduce maximum overload current of the drive (0x6073). – In case of high mass inertias, reduce maximum overload current of the drive (0x6073) to 150 %.	
2383	Warning - device utilization (I _{xt}) too high	Warning	– Check drive sizing.	0
3120	Mains phase loss	Error	– Check mains connection wiring. – Check fuses.	0
3210	Error - DC bus overvoltage	Error	– Reduce dynamic performance of the load profile.	0
3211	Warning: DC-bus overvoltage	Warning	– Check mains voltage. – Check settings for the brake energy management.	0
3220	Error - DC-bus undervoltage	Trouble	– Check mains voltage.	0
3221	Warning: DC bus undervoltage	Warning	– Check fuses. – Check DC-bus voltage (0x2D87). – Check mains settings.	0
3222	DC-bus voltage too low for switch-on	Warning	– Check mains voltage. – Check fuses. – Check mains settings.	0
4210	Error - power section overtemperature	Error	– Check mains voltage. – Ensure sufficient cooling of the device (display of heatsink temperature in 0x2D84:001). – Clean fan and ventilation slots. If required, replace fan. – Reduce switching frequency (0x2939).	0
4281	Warning - heatsink fan	Warning	– Clean fan and ventilation slots. If required, replace fan. The fans can be unlocked via locking hooks and can then be removed.	0
4310	Motor overtemperature	Error	– Check drive sizing. – Check motor temperature sensor and wiring at X105/T1+T2 or X109/T1+T2.	5
5112	24 V supply critical	Warning	– Check optional external auxiliary supply on X100.1/24E.1, if connected. – Check mains voltage.	0
5180	24 V supply overload	Warning	– Check 24 V output and digital outputs for ground fault or overload.	0
6280	Trigger/functions connected incorrectly	Trouble	– Check and correct the assignment of the triggers to the functions. – In network control, the two functions Drive enable (0x2631:001) and Start (0x2631:002) can also be set to Constant TRUE [1] to start the motor.	0
7180	Motor overcurrent	Error	– Check motor load. – Check drive sizing. – Adapt set error threshold (0x2D46:001).	1
FF06	Motor overspeed	Error	– Adapt the maximum motor speed (0x6080) and the error threshold (0x2D44:001).	1
FF37	Automatic start disabled	Error	– Deactivate start command and reset error.	0

Status LEDs

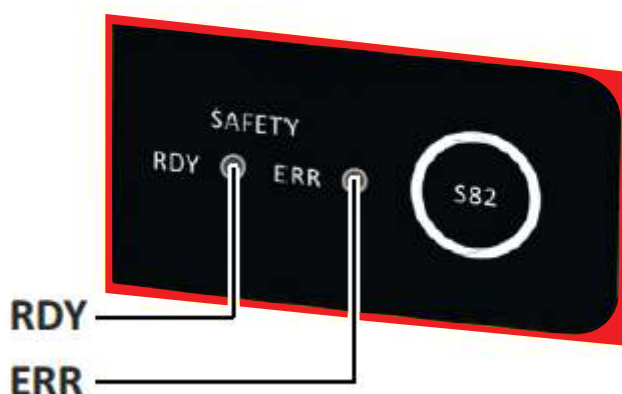
You can quickly obtain information on some operating states via the large **DRIVE** LED status display on the drive. This status display is composed of a blue LED **RDY** and a red LED **ERR**, which emit specific blinking patterns depending on the operating status:

LED RDY (blue)	LED ERR (red)	State/meaning
Off	Off	No supply voltage
		Initialization (drive is started)
 Flashes	Off	Safe torque off (STO) active. The drive has been disabled by the integrated safety function.
	 Flashes fast	Safe torque off (STO) active, warning active. The drive has been disabled by the integrated safety function.
	Off	Drive disabled
	 Flashes fast	Drive disabled, warning active.
 Flashes		Drive disabled, error active.
	 on briefly every 1.5 s	Drive disabled, no DC-bus voltage.
	off	Drive enabled. The motor rotates according to the specified setpoint or quick stop active.
	 flashes fast	Drive enabled, warning active. The motor rotates according to the specified setpoint or quick stop active.
	 flashes	Drive enabled, quick stop active as response to a fault.

Status-LEDs Safety

Only available for FS Series

The LEDs RDY and ERR show the current safety status:



NOTE: LEDs are not reliable status displays. It is not guaranteed that the LEDs provide exact information.

- Only use LEDs for general diagnostics during commissioning or troubleshooting.
- Do not use LEDs as status displays.

LED RDY (yellow)		Status	Meaning
Off		-	No status message active.
 Flashes yellow 1 Hz		Service status	Transfer of parameter set requested.

Display for Requested Acknowledgment

LED RDY (yellow)	LED ERR (red)	Status	Meaning
 On	Off	Restart acknowledgment requested	The device is working correctly.
	 Flashes red 1 Hz		During start-up, a modified parameter set was detected in the Init state.
	 Flashes red 2 Hz		During start-up, a changed safety address was detected in the Init state.

Display in the Event of Errors

LED RDY (yellow)	LED ERR (red)	Status	Meaning
	Off	-	The device is working correctly.
	 Flashes red 1 Hz	Error	One of the following errors has been detected: - A monitoring device has been activated. - An acknowledgeable error is active. - Discrepancy of the inputs
 Flashes red 1 Hz	 Flashes red 1 Hz		
	 Flashes red 2 Hz	Safety bus error	One of the following errors has been detected: - Discrepancy of the configuration parameters - CRC checksum error
			Communication via the safety bus is not established: - There is no valid configuration. - The start-up has not been completed yet.

Display for Critical Device Errors

LED RDY (yellow)	LED ERR (red)	Status	Meaning
 Flashes yellow	 Flashes red	Critical system error	Lock-out (CPU stopped) – STO is active. - If the system error occurs again after switching the 24 V supply, the device is defective. It must be replaced.

Disposal

If pollutants are disposed of improperly, they may cause a lasting damage to human health and the environment. Therefore, electrical and electronic equipment must be collected separately from unsorted municipal waste so that it may be recycled or disposed of properly.

The EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), which has been transposed into national law by the respective EU member states, applies to the disposal of equipment. As a customer, you have the option of disposing of the electrical and electronic equipment that you have purchased from us and that is subject to WEEE via the Schneider Electric branch in your country.

Schneider Electric addresses in Europe: <https://www.se.com>

Some Schneider Electric products contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC: Battery Directive [UKCA: S.I. 2009/890 – The Waste Batteries and Accumulators Regulations 2009]. Any batteries/rechargeable batteries included are designed to last the life of the product and do not need to be replaced or otherwise removed by the end user.

The crossed-out wheeled bin symbol is located on the equipment. This symbol indicates that used electrical and electronic products must not be disposed of with normal household waste.

The packaging of the equipment must be disposed of separately. Paper, cardboard and plastics must be recycled. Information on country-specific disposal obligations can be obtained from your regional disposal company.



Glossary

Index

Printed in:
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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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JPT12597.01