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Ultra motor starters



Introduction

The Altistart U01 is a soft start/soft stop unit for asynchronous motors. It is designed primarily for combinations with Ultra controller-starters.

When combined with a Ultra 1 controller by means of a connector 2, the Altistart U01 3 is a power option which provides the “Soft start/soft stop” function. The result is a unique, innovative motor starter.

Using the Altistart U01 starter enhances the starting performance of asynchronous motors by allowing them to start gradually, smoothly and in a controlled manner. It prevents mechanical shocks, which lead to wear and tear, and limits the amount of maintenance work and production downtime.

The Altistart U01 limits the starting torque and current peaks on starting, on machines which do not require a high starting torque.

The Altistart U01 is designed for the following simple applications:

- Conveyors
- Conveyor belts
- Pumps
- Fans
- Compressors
- Automatic doors and gates
- Small cranes
- Belt-driven machines, etc.

The Altistart U01 is compact and easy to install. It complies with standards IEC/EN 60947-4-2, carries UL, CSA, C-Tick, CCC certifications and CE marking.

■ ATSU01N2●●LT soft start/soft stop units

- Control two phases of the motor power supply to limit the starting current and for deceleration
- Internal bypass relay
- Motor power ratings ranging from 0.75 kW to 15 kW
- Motor supply voltages ranging from 200 V to 480 V, 50/60 Hz.

An external power supply is required for controlling the starter.

Description

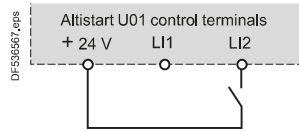
■ Altistart U01 soft start/soft stop units are equipped with:

- A potentiometer for setting the starting time 6
- A potentiometer for setting the deceleration time 8
- A potentiometer for adjusting the start voltage threshold according to the motor load 7
- 1 green LED 4 to indicate that the unit is switched on
- 1 yellow LED 5 to indicate that the motor is powered at nominal voltage, if it is connected to the starter
- A connector 9:
 - 2 logic inputs for Run/Stop commands
 - 1 logic input for the BOOST function
 - 1 logic output to indicate the end of starting
 - 1 relay output to indicate the starter has a power supply fault or the motor has reached a standstill at the end of the deceleration stage

ATSU01N2●●●LT soft start unit functions

■ 2-wire control

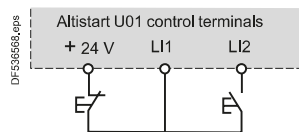
The run and stop commands are controlled by a single logic input. State 1 of logic input LI2 controls starting and state 0 controls stopping.



Wiring diagram for 2-wire control

■ 3-wire control

The run and stop commands are controlled by 2 different logic inputs. Stopping is achieved when logic input LI1 opens (state 0). The pulse on input LI2 is stored until input LI1 opens.



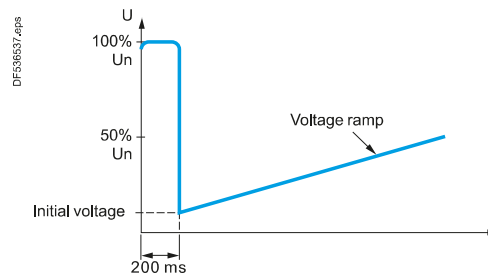
Wiring diagram for 3-wire control

■ Starting time

Controlling the starting time means that the time of the voltage ramp applied to the motor can be adjusted to obtain a gradual starting time, dependent on the motor load.

■ Voltage boost function via logic input

Activating the BOOST logic input enables the function for supplying a starting overtorque capable of overcoming any mechanical friction. When the input is at state 1, the function is active (input connected to the + 24 V) and the starter applies a fixed voltage to the motor for a limited time before starting.



Application of a voltage boost equal to 100% of the nominal motor voltage

■ End of starting

○ application function for logic output LO1

ATSU01N2●●●LT soft start/soft stop units are equipped with an open collector logic output LO, which indicates the end of starting when the motor has reached nominal speed.

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Altistart U01 soft starter

Product references

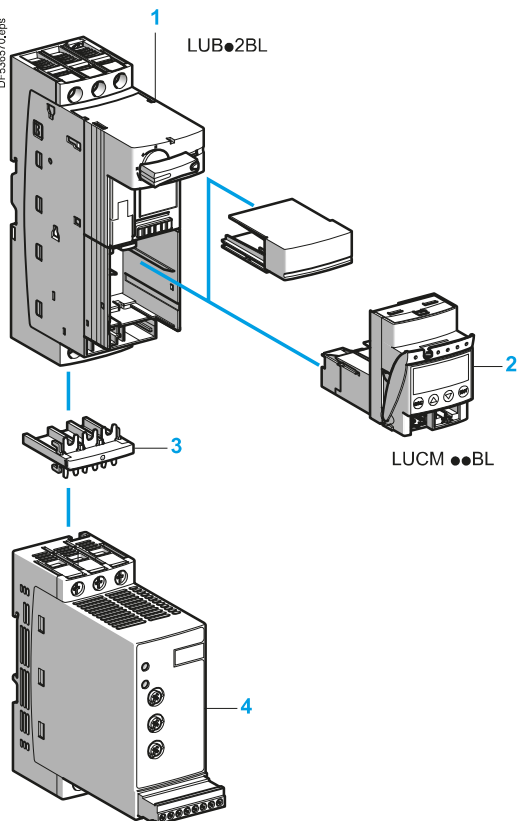
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ATSU01N222LT

Ultra motor starters

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ATSU 01N2●●LT

Soft start/soft stop units for 0.75 to 15 kW motors (can be combined with the Ultra starter)

Motor				Starter	
Motor power ⁽¹⁾				Nominal current	Reference
230 V		400 V	460 V		
kW	HP	kW	HP	A	
3-phase supply voltage: 200...480 V 50/60 Hz					
0.75	1	1.5	2	6	ATSU01N206LT
1.1	1.5	2.2	3		
		3			
1.5	2	–	5	9	ATSU01N209LT
–	–	4	–		
2.2	3	5.5	7.5	12	ATSU01N212LT
3	–	–	–		
4	5	7.5	10	22	ATSU01N222LT
5.5	7.5	11	15		
7.5	10	15	20	32	ATSU01N232LT

Accessories

Description	Used for starter	Reference
Power connector between ATSU01N2●●LT and U	ATSU01N2●●LT	VW3G4104

Ultra starter and soft start unit combinations

Numerous possibilities for combinations and options are offered. Please consult the "Ultra Starters-open version" specialist catalogue.

Motor power	Soft starter			U	
	230 V	400 V	460 V	Power base	Control unit ⁽²⁾
Voltage	kW/HP	kW	HP		
0.75/1	1.5	2		ATSU01N206LT	LUB12 LUC●05BL
1.1/1.5	2.2/3	3		ATSU01N206LT	LUB12 LUC●12BL
1.5/2	–	–		ATSU01N209LT	LUB12 LUC●12BL
–	4	5		ATSU01N209LT	LUB12 LUC●12BL
2.2/3	–	–		ATSU01N212LT	LUB12 LUC●12BL
3/–	5.5	7.5		ATSU01N212LT	LUB32 LUC●18BL
4/5	7.5	10		ATSU01N222LT	LUB32 LUC●18BL
5.5/7.5	11	15		ATSU01N222LT	LUB32 LUC●32BL
7.5/10	15	20		ATSU01N232LT	LUB32 LUC●32BL

Example of a starter-motor combination with:

- 1 non-reversing power base for DOL starting (LUB●2BL)
- 2 control unit (LUCM●●BL)
- 3 power connector (VW3G4104)
- 4 Altistart U01 soft start/soft stop unit (ATSU01N2●●LT)

(1) Standard motor power ratings, HP power ratings indicated according to standard UL508.
 (2) Depending on the configuration of the chosen Ultra starter, replace the ● with A for standard, B for expandable, and M for multifunction.

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Altistart U01 Soft starter

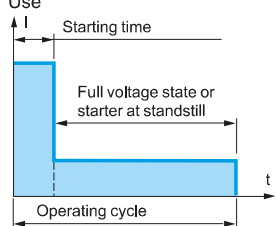
Characteristics

Ultra motor starters

Ref.

Environmental characteristics		ATSU01N2●●LT	
Type of starter			
Conformity to standards		Altistart U01 electronic starters have been developed to conform to the strictest international standards and the recommendations relating to electrical industrial control devices (IEC, EN), in particular standard IEC/EN 60947-4-2.	
Electromagnetic compatibility EMC			
	Conducted and radiated emissions	CISPR 11 level B, IEC 60947-4-2, level B	
	Harmonics	IEC 1000-3-2, IEC 1000-3-4	
	EMC immunity	EN 50082-2, EN 50082-1	
	Electrostatic discharge	IEC 61000-4-2 level 3	
	Immunity to radiated radio-electrical interference	IEC 61000-4-3 level 3	
	Immunity to electrical transients	IEC 61000-4-4 level 4	
	Voltage/current impulse	IEC 61000-4-5 level 3	
	Conducted and radiated emissions	IEC 61000-4-6 level 3	
	Immunity to conducted interference caused by radio-electrical fields	IEC 61000-4-11	
	Damped oscillating waves	IEC 61000-4-12 level 3	
CE marking		The starters carry CE marking in accordance with the European low voltage directives IEC/EN 60947-4-2.	
Product certifications		UL, CSA, C-Tick and CCC	
Degree of protection		IP 20	
Degree of pollution		2 conforming to IEC/EN 60947-4-2	
Vibration resistance		1.5 mm peak to peak from 3 to 13 Hz, 1 gn from 13 to 150 Hz, conforming to IEC/EN 60068-2-6	
Shock resistance		15 gn for 11 ms conforming to IEC/EN 60068-2-27	
Relative humidity		5...95 % without condensation or dripping water conforming to IEC 60068-2-3	
Ambient temperature around the unit	Storage	°C	-25...+70 conforming to IEC/EN 60947-4-2
	Operation	°C	-10...+40 without derating, up to 50°C with current derating of 2 % per °C above 40°C
Maximum operating altitude		m	1000 without derating (above this, derate the current by 2.2 % per additional 100 m)
Operating position			
Maximum permanent angle in relation to the normal vertical mounting position			

Electrical characteristics		ATSU01N2●●LT	
Type of starter			
Category of use	Conforming to IEC 60947-4-2	Ac-53b	
Rated operating voltage	3-phase ~ voltage	V	200 - 10 % to 480 + 10 %
Frequency		Hz	50 - 5 % to 60 + 5 %
Output voltage		Maximum 3-phase voltage equal to line supply voltage	
Control supply voltage		24 V $\overline{\text{---}}$, 100 mA \pm 10 %	
Rated operating current		A	6...32
Adjustable starting time		s	1...10
Adjustable deceleration time		s	1...10
Starting torque		%	30... 80 % of DOL motor starting torque
Type of starter	ATSU	01N206LT	01N209LT 01N212LT 01N222LT 01N232LT
Control power supply consumption		24 V $\overline{\text{---}}$, 65 mA	
Power dissipated	At full load at end of starting	W	1.5 1.5 1.5 2.5 2.5
	In transient state at 5 times the rated operating current	W	61.5 91.5 121.5 222.5 322.5
Type of starter		ATSU01N206LT to ATSU01N222LT ATSU01N232LT	
Use	Starting time	s	1 5 10 1 5 10
	Maximum number of cycles per hour		100 20 10 50 10 5



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Altistart U01 Soft starter

Characteristics

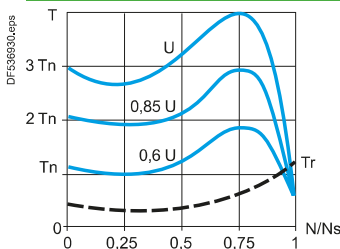
Electrical characteristics (continued)

Logic input power supply (electrically isolated between power and control) + 24 V, COM		24 V ±10 % Isolated Max. current 100 mA
Logic inputs LI1, LI2, BOOST Stop, run and boost on start-up functions		Logic inputs with impedance 27 kΩ; 24 V power supply (U max 40 V) Max. current 8 mA State 0 if U < 5 V and I < 0.2 mA State 1 if U > 13 V and I > 0.5 mA
Logic output LO1 End of starting signal		Open collector logic output: External 24 V power supply (minimum 6 V, maximum 30 V) Max. current 200 mA
Relay output R1AR1C		Normally open (N/O) contact Minimum switching capacity: 10 mA for 6 V --- Maximum switching capacity on inductive load (cos φ = 0.5 and L/R = 20 ms): 2 A for 250 V ~ or 30 V --- (AC-15) Maximum operating voltage 440 V
LED signalling	Green LED Yellow LED	Starter powered up Nominal voltage reached

Connections (maximum connection capacity and tightening torque)

Power circuit			Connection to Ø4 mm screw clamps	
Flexible wire without cable end	1 conductor	mm ²	1.5...10	8 AWG
	2 conductors	mm ²	1.5...6	10 AWG
Flexible wire with cable end	1 conductor	mm ²	1...6	10 AWG
	2 conductors	mm ²	1...6	10 AWG
Rigid wire	1 conductor	mm ²	1...10	8 AWG
	2 conductors	mm ²	1...6	10 AWG
Tightening torque		N.m	1.9...2.5	
Control circuit			Screw connector	
Flexible wire without cable end	1 conductor	mm ²	0.5...2.5	14 AWG
	2 conductors	mm ²	0.5...1.5	16 AWG
Flexible wire with cable end	1 conductor	mm ²	0.5...1.5	16 AWG
	2 conductors	mm ²	0.5...1.5	16 AWG
Rigid wire	1 conductor	mm ²	0.5...2.5	14 AWG
	2 conductors	mm ²	0.5...1	17 AWG
Tightening torque		N.m	0.5	

Torque characteristics (typical curves)



The diagram opposite shows the torque/speed characteristic of a cage motor in relation to the supply voltage. The torque varies in line with the square of the voltage at a fixed frequency. The gradual increase in the voltage prevents the instantaneous current peak on power-up.

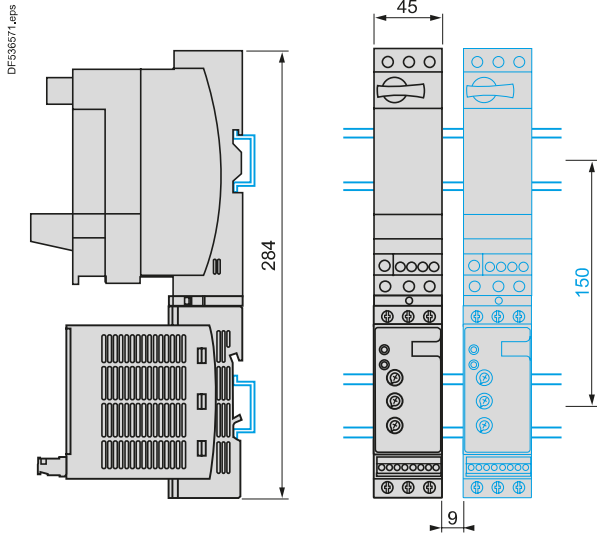


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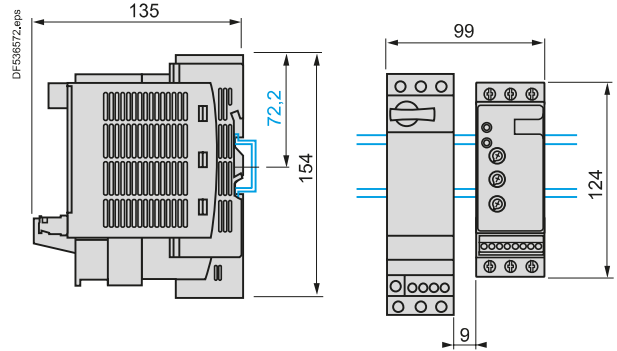
Altistart U01 Soft starter

Dimensions

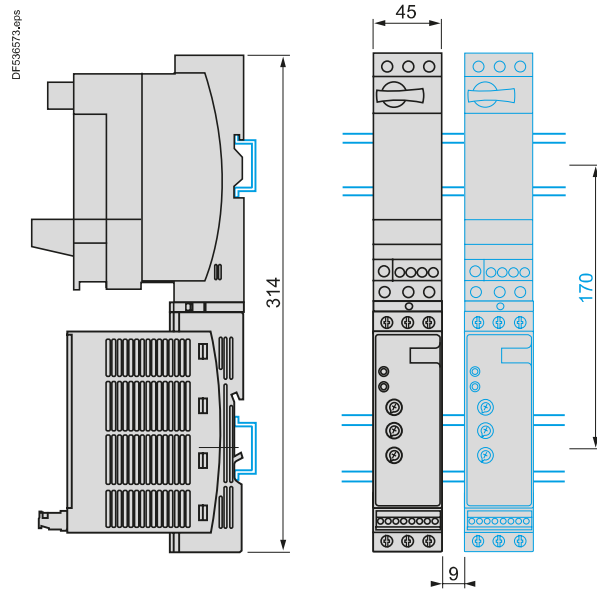
Ultra combination (non-reversing power base) and ATSU01N206LT to ATSU01N212LT
 Mounting on \perp (35 mm) rail with VW3G4104 connector



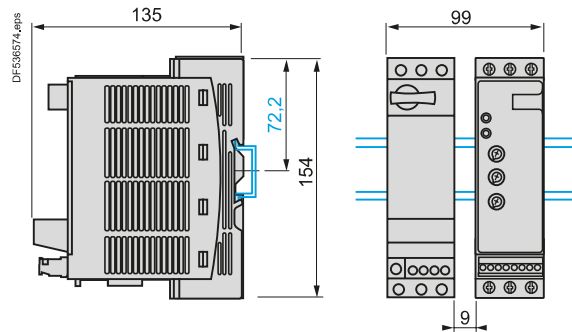
Ultra combination (non-reversing or reversing power base) and ATSU01N206LT to ATSU01N212LT
 Side by side mounting



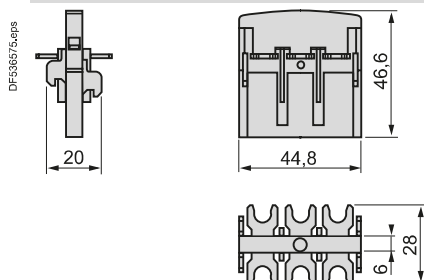
Ultra combination (non-reversing power base) and ATSU01N222LT to ATSU01N232LT
 Mounting on \perp (35 mm) rail with VW3G4104 connector



Ultra combination (non-reversing or reversing power base) and ATSU01N222LT to ATSU01N232LT
 Side by side mounting



VW3G4104 connector



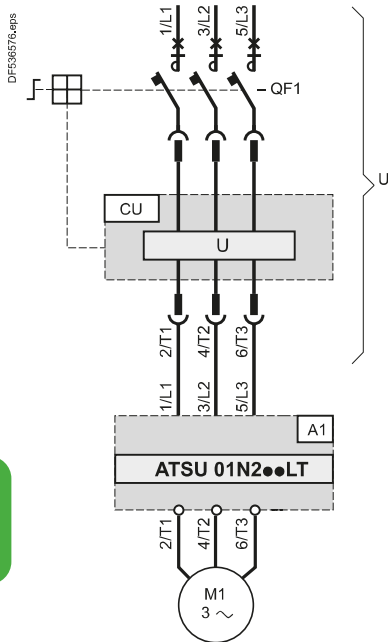
Ultra motor starters

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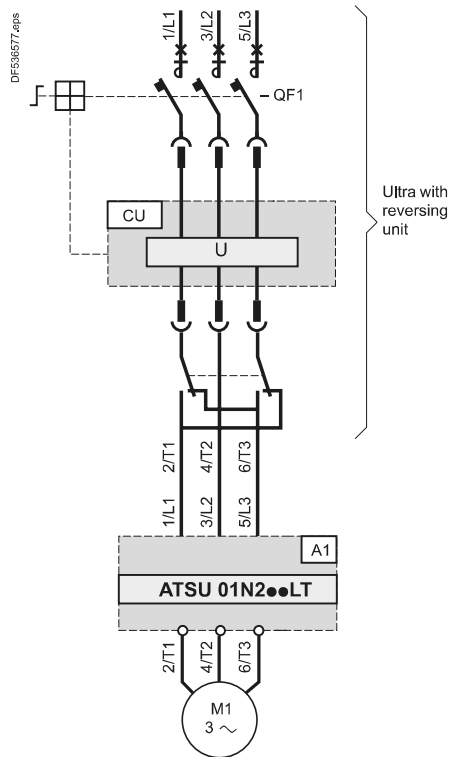


ATSU01N2●●LT soft start/soft stop units

Power wiring



Power wiring with reversing unit



Ultra motor starters

Ref.



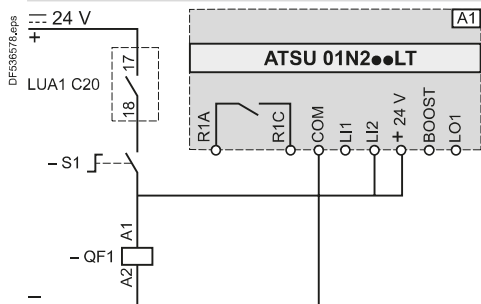
Compatible components

Code	Description
A1	Soft start/soft stop unit
QF1	Ultra controller-starter
CU	Ultra control unit

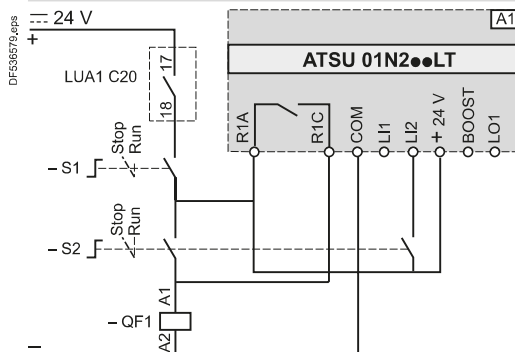
ATSU01N2●●LT soft start/soft stop units (continued)

Automatic 2-wire control

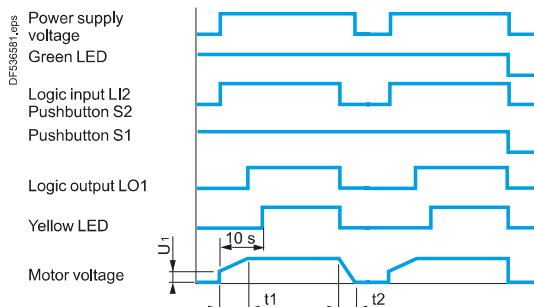
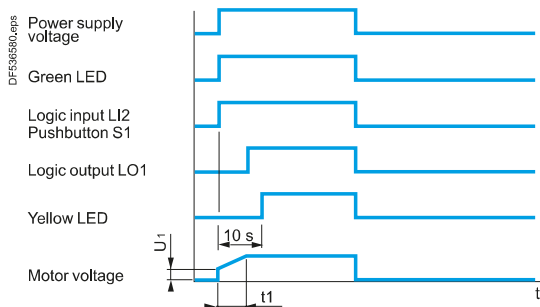
Without deceleration



With and without deceleration

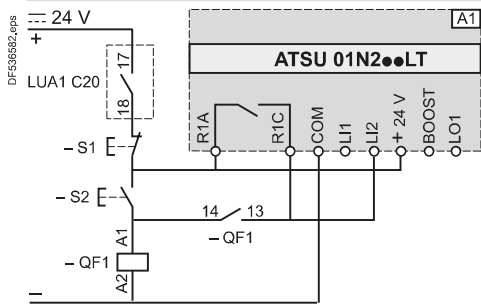


Functional diagrams

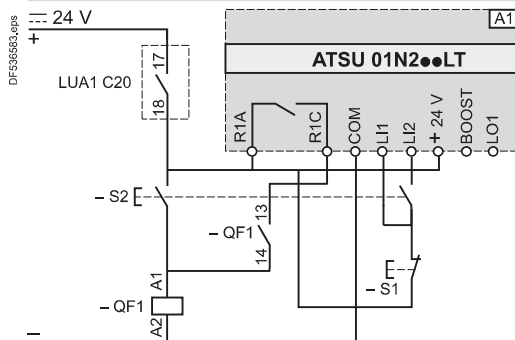


Automatic 3-wire control

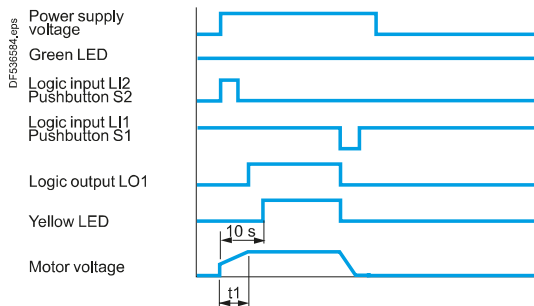
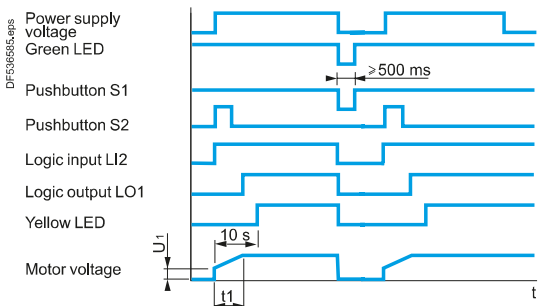
Without deceleration



With deceleration



Functional diagrams

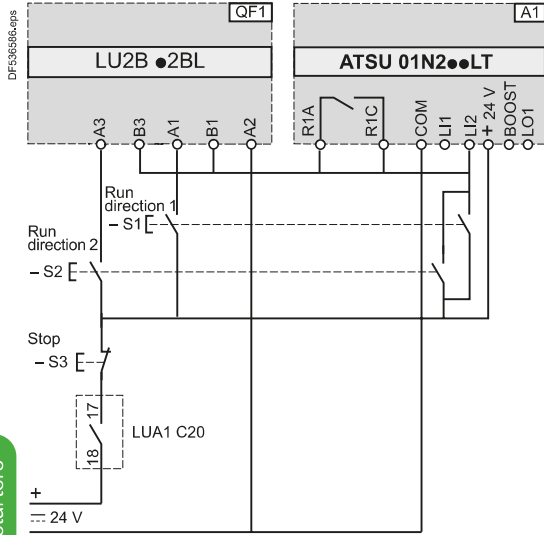


A1: Soft start/soft stop unit
 S1, S2: XB4B or XB5B pushbuttons
 QF1: Ultra controller-starter
 t1: Acceleration time can be controlled by a potentiometer
 t2: Deceleration time can be controlled by a potentiometer
 U_r: Starting time can be controlled by a potentiometer

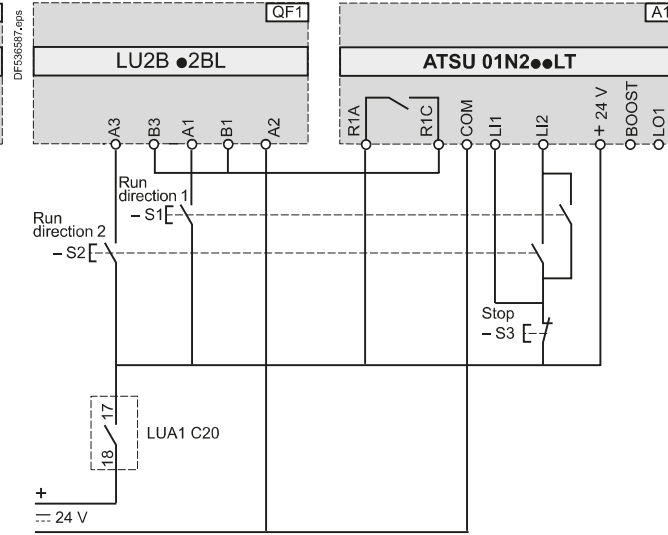
ATSU01N2●●LT soft start/soft stop units (continued)

Automatic 3-wire control, with reversing unit

Without deceleration



With deceleration



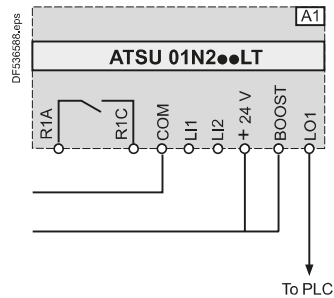
Ultra motor starters

Ref.

QF1: Ultra controller-starter with reversing unit
 A1: Soft start/soft stop unit
 S1, S2, S3: XB4B or XB5B pushbuttons
 S3: minimum depression time 500 ms

QF1: Ultra controller-starter with reversing unit
 A1: Soft start/soft stop unit
 S1, S2, S3: XB4B or XB5B pushbuttons

Boost on starting and end of starting signal

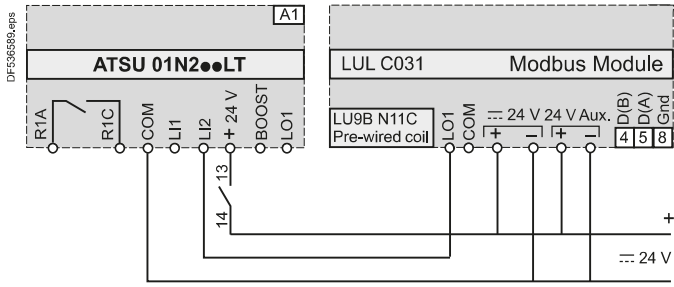


A1: Soft start/soft stop unit

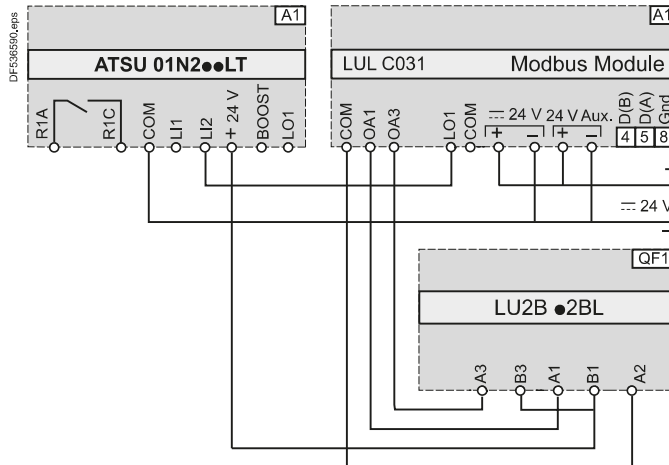
ATSU01N2●●LT soft start/soft stop units (continued)

Automatic control with Modbus communication module, with and without deceleration

Without reversing unit



With reversing unit



Function	Register	Bit	Value
Powering down U and ATSU			
-	704	0	0
Automatic control without deceleration			
Run	700	0	1
Stop	704	0	0
Automatic control with deceleration			
Run	700	0	1
Soft stop	700	0	0

Function	Register	Bit	Value
Powering up U and ATSU			
Forward	704	0	1
Reverse	704	1	1
Powering down U and ATSU			
Forward	704	0	0
Reverse	704	1	0
Automatic control without deceleration			
Run	700	0	1
Stop forward	704	0	0
Stop reverse	704	1	0
Automatic control with deceleration (forward or reverse)			
Run	700	0	1
Soft stop	700	0	0

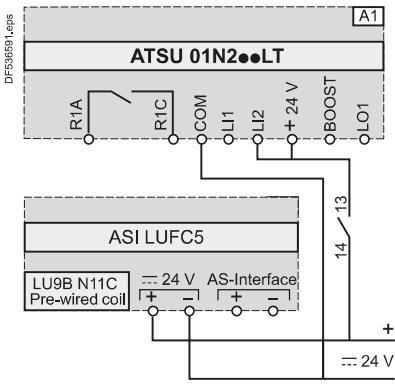
A1: Soft start/soft stop unit

A1: Soft start/soft stop unit

QF1: Ultra controller-starter with reversing unit

Automatic control with AS-Interface communication module, without deceleration

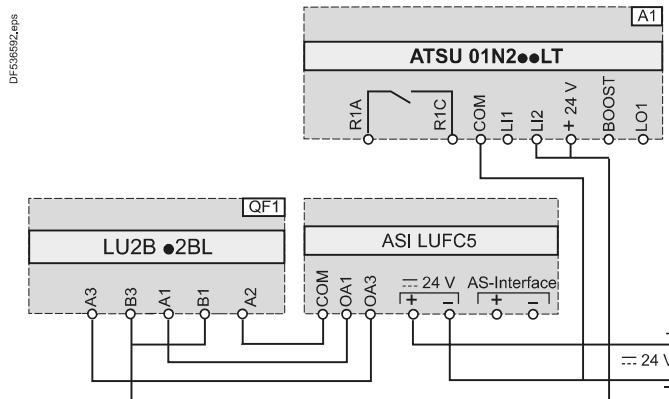
Without reversing unit



Function	Bit	Value
Power-up and automatic control without deceleration		
Run	D0	1
Stop	D0	0

A1: Soft start/soft stop unit

With reversing unit



Function	Bit	Value
Power-up and automatic control without deceleration		
Run forward	D0	1
Stop	D0	0
Run reverse	D1	1
Stop	D1	0

A1: Soft start/soft stop unit

QF1: Ultra controller-starter with reversing unit