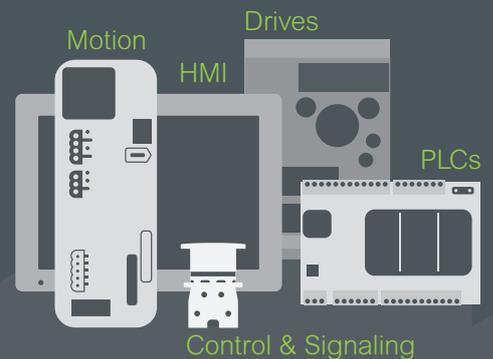




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Easy Altivar 310L

Variable speed drives

For applications from 0.75 to 5.5 kW / 1 to 7.5 HP

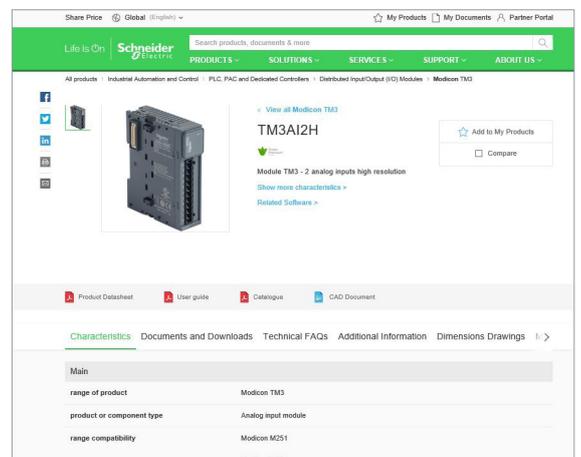
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References

Modicon TM3
I/O expansion modules for Modicon controllers
Analog I/O modules

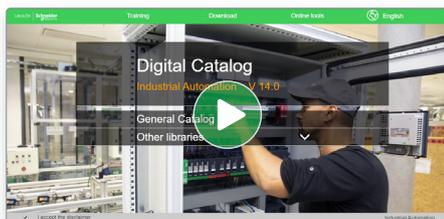
Number and type of channels	Input range	Output range	Resolution	Input format (internal)	Reference	Weight (kg)
2 voltage inputs	-15...+10 VDC 0...10 VDC 0...20 mA, I _{sc} 20 mA	16.0% of 10.0% of	16.0% of 10.0% of	Source Sink	TM3AI2H TM3AI2G	0.110 0.100
4 voltage inputs	-15...+10 VDC 0...10 VDC 0...20 mA, I _{sc} 20 mA	12.0% of 10.0% of	12.0% of 10.0% of	Source Sink	TM3AI4 TM3AI4G	0.100 0.100
4 voltage or temperature inputs	-15...+10 VDC 0...10 VDC 0...20 mA, I _{sc} 20 mA	16.0% of 10.0% of	16.0% of 10.0% of	Source Sink	TM3AI2H TM3AI2G	0.110 0.100
4 differential temperature inputs	Thermopiles (I, II, N, S, T, E, C) RTDs (Pt100, Ni100, Pt1000, Ni1000)	16.0% of 10.0% of	16.0% of 10.0% of	Source Sink	TM3TI4 TM3TI4G	0.110 0.100
8 self-diagnosing	-15...+10 VDC	12.0% of	12.0% of	Source	TM3AI8	0.110



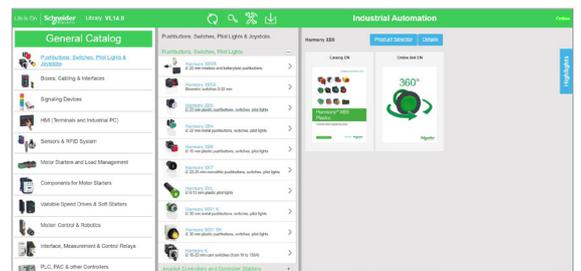
Each commercial reference presented in a catalog contains a hyperlink. Click on it to obtain the technical information of the product:

- Characteristics, Dimensions and drawings, Mounting and clearance, Connections and schemas, Performance curves
- Product image, Instruction sheet, User guide, Product certifications, End of life manual

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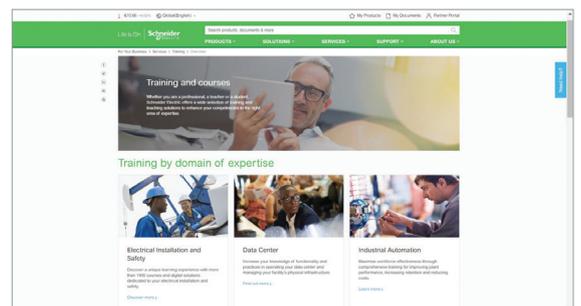


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Easy Altivar 310L variable speed drives

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Conveyor application

Presentation

The Easy Altivar™ 310L drive is a frequency inverter for three-phase 380...460 V asynchronous motors rated from 0.75 kW/1 HP to 5.5 kW/7.5 HP.

The all in one robust design of this drive, its ease of installation, based on the principle of Plug & Play, its integrated functions and macro configuration make it particularly suitable for decentralized applications in the material handling segment, specially conveyor and sorting machines.

By taking account of the constraints governing installation and use at the product design stage, we have been able to offer a reliable, cost-effective solution to manufacturers of OEM machines.

The Easy Altivar 310L has been developed with no compromise on quality : the components are designed to last 10 years.

Applications

The Easy Altivar 310L incorporates functions that are suitable for material handling, covering both conveyor and sorting applications.

Functions

In addition to the functions usually available on this type of drive, the Easy Altivar 310L drive also features the following:

Motor control functions (1)

- Motor control profiles:
 - Performance: Vector control
 - Standard: U/F 2 points
 - Quadratic load: U²/F
- Cooling fan thermal control
- Switching frequency management
- Boost torque
- Motor noise reduction
- Current limitation
- Auto DC injection

Application functions (1)

- Frequency skip
- Preset speeds
- S ramp, U ramp, ramp switching
- Jog operation
- +/- speed around reference
- Freewheel stop, fast stop
- Automatic catching a spinning load with speed detection and automatic restart
- Brake logic function

Control functions (1)

- Channel configuration - Start/Stop, Local mode, Remote mode
- Reference channel selection
- Reverse inhibition
- Force local control
- Store customer parameter settings

Protection and maintenance functions (1)

- Protection of the installation by means of underload and overload detection
- Maintenance functions:
 - HMI password
 - Configuring the logic I/O
 - Configuring how the parameters are displayed
 - Viewing the state of the logic inputs on the drive display
 - Key parameters display (drive power on / Fan time / Process elapsed time)
 - The last 4 fault display, error log, etc.

(1) For the implementation of functions, please consult the user manual on our local website.



Sorting application

An optimized offer

Environment

The entire range conforms to international standards IEC/EN 61800-5-1 and IEC/EN 61800-3 and has been developed to meet the requirements of directives regarding the protection of the environment (RoHS, WEEE). Owing to its innovated air flow design and to its thicker coating which avoids polluting PCB, the range can be used in the harshest environments. It can withstand a 45 °C/113 °F ambient air temperature around the device without derating (1). Its degree of protection is IP 54.

Adaptability and performances

The Easy Altivar 310L has been designed with an increased adaptability to different motors and various tough loads.

One of its main quality is its torque capacity for starting and braking:

- Braking capacity:
 - over 80 % of the rated motor torque without braking resistor
 - 150 % of the rated motor torque with braking resistor (see [page 6](#))
- Torque capacity
 - starting torque 150 % at 3 Hz
 - over torque : 150 to 170 %, depending on model (2).

Easy to integrate in system

The Easy Altivar 310L drive integrates as standard the AS-i communication protocol, which can be accessed via the M12 connector located on the underside of the drive. AS-i is a field bus over which IO, speed reference, VSD state and alarm information circulates. For more information on the complementary characteristics of AS-i port (address, single/dual mode, ...), please consult our local website. Customer can address AS-i through AS-i addressing port or through the parameter setting.

Easy to install

All ATV 310L use the same installation size in order to standardize customer's system and installation hole. The Easy Altivar 310L drives can easily and quickly be installed as:

- they are easy and quick to wire due to their Plug & Play concept. Power input and output used heavy duty connectors, and Logic input/output used M12 connectors.
- they can be identified on the front panel.

Easy to commission

Simple Loader and Multi-Loader configuration tools

The Simple Loader tool enables one powered-up drive's configuration to be duplicated on another powered-up drive. Operation is very simple.

The Multi-Loader tool enables configurations from a PC or drive to be copied and duplicated on another drive.

Easy to maintain

A warning is sent by the drive to the user when it is necessary to clean heat sink or replace cooling fan.

The security of the system is ensured by an access code allowing authorized people to configure applications and settings in Configuration mode. Simple users are only allowed to use the Monitoring mode (parameters display).

Key Switch

Key switch could be used to change the control mode.

- ATV310L●●N4 embedded 2 positions key switch, could be used to change between local mode and remote mode.
- ATV310L●●N4T embedded 3 positions key switch, could be used to change between local mode, stop mode and remote mode.

(1) Over this temperature, see the derating curves in the User Manual, available on our website.

(2) For more information, please refer to our local website.



Simple-Loader configuration tool



Multi-Loader configuration tool

An optimized offer (continued)

Load Switch

When the load switch is set to OFF, all power to the motor is terminated then the motor can be repaired or replaced as required.

HMI, communication and connectors

- LED display with buttons (MODE, ESC, UP, OK, DOWN, REV, STOP/RESET, FWD)
- Heavy duty connector
- M12 connector
- AS-i topology
- 4 logic inputs and 2 logic outputs

Characteristics and functions of the control terminals

Terminal	Function	Electrical characteristics
OV or COM	Common of the logic I/Os	
LO1 LO2	Common of the logic outputs (emitter)	<ul style="list-style-type: none"> ■ Rated Voltage: 24 VDC ■ Power supply input range: 19.2V-28.8 VDC ■ Power supply reverse protection ■ Current: 0.5 A ■ Response time: 2 ms ■ Insulation resistance: >10 MΩ ■ Residual voltage: <15 V at 0.1 A ■ Impedance: 80 Ω
L11 L12 L13 L14	Logic inputs	Programmable logic inputs, comply with IEC/EN 61131-2 logic type 1 <ul style="list-style-type: none"> ■ + 24 VDC power supply (maximum 30 V) ■ Impedance: 3.5 kΩ ■ State: 0 if ≥ 15 V ■ State: 1 if ≤ 10 V ■ sampling time: < 8 ms ± 0.7 ms
+ 24 V	+ 24 VDC supply provided by the AS-i communication via the drive	+ 24 VDC -15% +20% protected against short-circuits and overloads. Maximum customer current available: 100 mA
ASi+	AS-i positive	<ul style="list-style-type: none"> ■ Nominal bus supply voltage: 30 VDC ■ AS-i voltage 26.5 VDC to 31.6 VDC ■ Auxillary power supply: 19.2 V to 28.8 VDC ■ Power consumption of AS-i voltage: ≤ 50 mA (+ output currents)
AS-	AS-i negative	
Aux24 V	Auxiliary 24 V	
Aux0 V	Auxiliary 0 V	



Heatsink drives:
ATV310L075N4...U30N4



Ventilated drives:
ATV310LU40N4, ATV310LU55N4



Heatsink drives:
ATV310L075N4T...U30N4T



Ventilated drives:
ATV310LU40N4T,
ATV310LU55N4T

Drives

Three-phase supply voltage: 380...460 V 50/60 Hz

Motor Power indicated on rating plate (1)	Line supply			Altivar 310					Reference	Weight (3)
	Max. line current (2)	Apparent power		Max. prospec- tive line Isc	Maximum continuous output current (In) (1)	Maximum transient current for 60 s	Dissipated power at maximum output current (In) (1)			
		380 V	460 V					460 V		
kW	HP	A	A	kVA	kA	A	A	W	kg/ lb	
With 2-positions key switch										
0.75	1	3.5	3.1	2.5	5	2.3	3.5	28.83	ATV310L075N4	6.900/ 15.211
1.5	2	6.5	5.4	4.3	5	4.1	6.2	51.82	ATV310LU15N4	6.900/ 15.211
2.2	3	8.8	7.2	5.7	5	5.5	8.3	66.32	ATV310LU22N4	6.900/ 15.211
3	4	11.1	9.2	7.3	5	7.1	10.7	80.24	ATV310LU30N4	6.900/ 15.211
4	5	13.7	11.4	9.1	5	9.5	14.3	102.72	ATV310LU40N4	7.400/ 16.314
5.5	7.5	21.3	14.3	11.4	5	12.6	18.9	141.54	ATV310LU55N4	7.400/ 16.314
With 3-positions key switch										
0.75	1	3.5	3.1	2.5	5	2.3	3.5	28.83	ATV310L075N4T	6.900/ 15.211
1.5	2	6.5	5.4	4.3	5	4.1	6.2	51.82	ATV310LU15N4T	6.900/ 15.211
2.2	3	8.8	7.2	5.7	5	5.5	8.3	66.32	ATV310LU22N4T	6.900/ 15.211
3	4	11.1	9.2	7.3	5	7.1	10.7	80.24	ATV310LU30N4T	6.900/ 15.211
4	5	13.7	11.4	9.1	5	9.5	14.3	102.72	ATV310LU40N4T	7.400/ 16.314
5.5	7.5	21.3	14.3	11.4	5	12.6	18.9	141.54	ATV310LU55N4T	7.400/ 16.314

Dimensions (overall)

Drives with heatsinks	W x H x D mm	in.
ATV310L075N4...ATV310LU30N4 ATV310L075N4T...ATV310LU30N4T	445 x 210 x 171	17.52 x 8.26 x 6.73
Drives with ventilation	W x H x D mm	in.
ATV310LU40N4, ATV310LU55N4, ATV310LU40N4T, ATV310LU55N4T	445 x 210 x 191	17.52 x 8.26 x 7.52

(1) These values are given for a nominal switching frequency of 4 kHz, for use in continuous operation. If operation above 4 kHz needs to be continuous, the nominal drive current should be derated by 10% for 8 kHz and 20% for 12 kHz. The switching frequency can be set between 2 and 12 kHz for all ratings. Above 4 kHz, the drive will reduce the switching frequency automatically in the event of an excessive temperature rise. See the derating curves in the User Manual, available on our local website.

(2) Typical value for the indicated motor power and for the maximum prospective line Isc.

(3) Weight of product without packaging.

Configuration tools			
Description	For drives	Reference	Weight kg/ lb
Simple Loader, Multi-Loader configuration tools and associated cable			
Simple Loader tool For duplicating one drive configuration on another drive. The drives must be powered-up. The tool is supplied with a cordset equipped with 2 RJ45 connectors.	ATV310L●●●N4 ATV310L●●●N4T	VW3A8120	–
Multi-Loader tool For copying a configuration on a PC or drive and duplicating it on another drive. The drives do not need to be powered-up. Supplied with the tool: <ul style="list-style-type: none"> ■ 1 cordset equipped with 2 RJ45 connectors ■ 1 cordset equipped with a USB type A connector and a USB Mini-B type connector ■ 1 x 2 GB minimum SD memory card ■ 1 female/female RJ45 adaptor ■ 4 AA/LR6 1.5 V batteries 	ATV310L●●●N4 ATV310L●●●N4T	VW3A8121	–

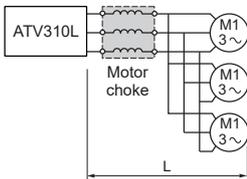
Presentation

Line chokes

A line choke can be used to provide improved protection against overvoltages on the line supply and to reduce harmonic distortion of the current produced by the drive. They are recommended for ATV310L...N4/N4T drives. The recommended chokes limit the line current. They have been developed in line with standard EN 50178 (VDE 0160 level 1 high energy overvoltages on the line supply). The choke values are defined for a voltage drop between phases of between 3% and 5% of the nominal supply voltage. Values higher than this will cause loss of torque. These chokes should be installed upstream of the drive.

The use of line chokes is recommended in particular under the following circumstances:

- Close connection of several drives in parallel
- Line supply with significant disturbance from other equipment (interference, overvoltages)
- Line supply with voltage imbalance between phases above 1.8% of the nominal voltage
- Drive supplied by a line with very low impedance (in the vicinity of a power transformer 10 times more powerful than the drive rating)
- Installation of a large number of frequency inverters on the same line
- Reducing overloads on the cosφ correction capacitors, if the installation includes a power factor correction unit.



Motor chokes and LR filter cell

Motor chokes are required:

- When connecting more than 2 motors in parallel
- When the motor cable length (L), including tap-offs, is:
 - 25 m/82.2 ft maximum for a shielded motor cable (1),
 - 50 m/164.4 ft maximum for an unshielded motor cable (1).

LR filter cell comprises 3 high-frequency chokes and 3 resistors.

References

Line chokes

For drives

	Line current without choke		Line current with choke		Choke Reference	Weight
	380 V	460 V	380 V	460 V		
	A	A	A	A	kg/lb	
ATV310L075N4/N4T	3.5	3.1	1.9	1.7	VW3A4551	1.500/ 3.310
ATV310LU15N4/N4T	6.5	5.4	3.5	2.9	VW3A4552	3.700/ 8.160
ATV310LU22N4/N4T	8.8	7.2	5.1	4.4		
ATV310LU30N4/N4T	11.1	9.2	6.6	5.6		
ATV310LU40N4/N4T	13.7	11.4	8.5	7.1	VW3A4553	4.100/ 9.040
ATV310LU55N4/N4T	21.3	14.3	11.6	9.9		

Motor Choke and LR filter cell

For drives

	Losses W	Nominal current A	Reference	Weight
				kg/lb
ATV310L075N4/N4T...LU15N4/N4T	150	10	VW3A58451	7.400/ 16.310
ATV310LU22N4/N4T...LU40N4/N4T	65	10	VW3A4552	3.700/ 8.160
ATV310LU55N4/N4T	75	16	VW3A4553	4.100/ 9.040

Dimensions (overall)

Line chokes, LR filter cell

	W x H x D	
	mm	in.
VW3A4551	100 x 135 x 60	3.94 x 5.31 x 2.36
VW3A4552, A4553	130 x 155 x 90	5.12 x 6.1 x 3.54
VW3A58451	169.5 x 340 x 123	6.67 x 13.39 x 4.84

(1) Motor cable length given for a switching frequency of 4 kHz.

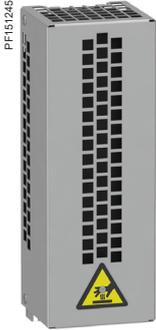


VW3A4551

Variable speed drives

Easy Altivar 310L

Options: braking resistors, spare parts



VW3A7730

Braking resistors					
For drives	Minimum Ohmic value	Ohmic value at		Reference	Weight
		20° C/68 °F	50° C/122 °F (1)		
	Ω	Ω			kg/lb

Not protected resistor (IP 00) (2)					
ATV310LU15N4/N4T	80	100	28	VW3A7723	0.600/1.320
ATV310LU22N4/N4T	60				
ATV310LU30N4/N4T	36	100	35	VW3A7725	0.850/1.870
ATV310LU40N4/N4T	36				
Protected resistor (IP 20)					
ATV310L075N4/N4T	36	100	100	VW3A7730	1.500/3.306
ATV310LU15N4/N4T	36				
ATV310LU22N4/N4T	36				
ATV310LU30N4/N4T	36				
ATV310LU40N4/N4T	36				
ATV310LU55N4/N4T	28	60	160	VW3A7731	2.000/4.409

For drives	Ohmic value	Average power available at	Length of connection cable	Reference	Weight
	Ω	W			kg/lb

Protected resistor (IP 65)					
ATV310L075N4/N4T	100	100	0.75/2.46	VW3A7608R07	0.410/0.902
ATV310LU15N4/N4T					
ATV310LU22N4/N4T					
ATV310LU30N4/N4T					
ATV310LU40N4/N4T					
ATV310LU55N4/N4T					

Protected resistor (IP 65)					
ATV310L075N4/N4T	100	100	3.00/9.84	VW3A7608R30	0.760/1.672
ATV310LU15N4/N4T					
ATV310LU22N4/N4T					
ATV310LU30N4/N4T					
ATV310LU40N4/N4T					
ATV310LU55N4/N4T					

Other option			
Description	For Drives	Reference	Weight kg/lb
IP 54 PA/PB cover	ATV310L●●●N4/N4T	VW3L7000	0.170/0.374

Dimensions (overall)			
Braking resistors	W x H x D		
	mm	in.	
VW3A7608R07	60 x 170 x 30	2.36 x 6.69 x 1.18	
VW3A7608R30	62 x 212 x 36	2.44 x 8.35 x 1.42	
VW3A7723	60 x 30 x 170	2.36 x 1.18 x 6.69	
VW3A7725	62 x 36 x 195	2.44 x 1.42 x 7.68	
VW3A7730	105 x 295 x 100	4.13 x 11.61 x 3.93	
VW3A7731	105 x 345 x 100	4.13 x 13.58 x 3.93	

Note: Braking resistors allow ATV310L drives to operate while braking to a standstill or during slowdown braking, by dissipating the braking energy. They enable maximum transient braking torque. Depending on the drive rating, the following types of resistor are available:

- Enclosed model (IP 20 casing) designed to comply with the EMC standard and protected by a temperature controlled switch
- Enclosed model (IP 65 casing) with cordset

(1) Load factor for resistors: the value of the average power that can be dissipated at 50 °C from the resistor into the casing is determined for a load factor during braking that corresponds to the majority of normal applications.
 For VW3A7701...703:
 - 2 s braking with a 0.6 Tn braking torque for a 40 s cycle
 - 0.8 s braking with a 1.5 Tn braking torque for a 40 s cycle
 (2) For not protected resistors, add a thermal overload device.

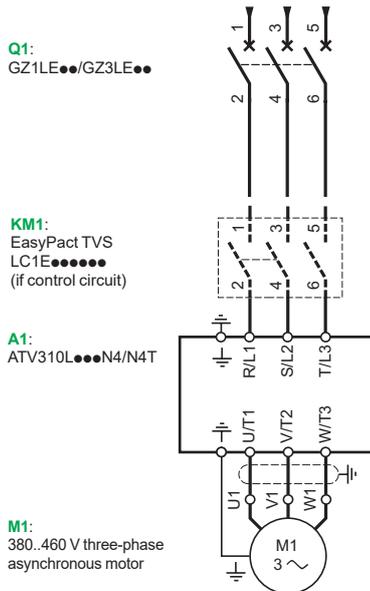
Applications

The proposed combinations can:

- Protect people and equipment (when a short-circuit occurs)
- Maintain protection upstream of the drive in the event of a short-circuit on the power stage

Two types of combination are possible:

- Drive + circuit-breaker: Minimum combination
- Drive + circuit-breaker + contactor: Minimum combination with contactor when a control circuit is needed



Motor starter with three-phase power supply

Motor starters

Standard power ratings of three-phase 4-pole 50/60 Hz motors (2)	Variable speed drive	Combination with control circuit (circuit-breaker + contactor)	
		Minimum combination (circuit-breaker only)	EasyPact TVS contactor (1)
kW	HP	EasyPact TVS motor circuit-breaker	Operating range or rating
			A
M1	A1	Q1	KM1
Three-phase supply voltage: 380...460 V 50/60 Hz			
0.75	1	ATV310L075N4/N4T	GZ1LE08 4 LC1E06●●●●
1.5	2	ATV310LU15N4/N4T	GZ1LE14 10 LC1E09●●●●
2.2	3	ATV310LU22N4/N4T	
3	4	ATV310LU30N4/N4T	GZ1LE16 14 LC1E18●●●●
4	5.4	ATV310LU40N4/N4T	GZ1LE20 18 LC1E18●●●●
5.5	7.4	ATV310LU55N4/N4T	GZ3LE25 25 LC1E25●●●●

(1) For a complete list of references for EasyPact TVS contactors, please visit our local website.

(2) Motor power indicated for combination with an ATV310L●●●N4/N4T drive with the same rating.

A

ATV310L075N4	5
ATV310L075N4T	5
ATV310LU15N4	5
ATV310LU15N4T	5
ATV310LU22N4	5
ATV310LU22N4T	5
ATV310LU30N4	5
ATV310LU30N4T	5
ATV310LU40N4	5
ATV310LU40N4T	5
ATV310LU55N4	5
ATV310LU55N4T	5

V

VW3A4551	7
VW3A4552	7
VW3A4553	7
VW3A58451	7
VW3A7608R07	8
VW3A7608R30	8
VW3A7723	8
VW3A7725	8
VW3A7730	8
VW3A7731	8
VW3A8120	6
VW3A8121	6
VW3L7000	8

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