

AC Drive and Soft Start Product Line Selection Guide



AC Drives & Soft Starts for Pump, Fan, Machine Builder & Industrial Process Applications

Pump & Fan Applications

Ideal for office buildings, data centers, water/wastewater plants, and other industrial and commercial facilities



Altivar® 21 Mid-Featured AC Drives

Offering unmatched value in installed cost and functionality for centrifugal pump and fan applications, the Telemecanique® brand Altivar 21 AC Drive offers just the right solution for OEMs and control panel builders. The Altivar 21 Drive can communicate through its native Modbus® port or be fitted with an option card for connectivity to Lonworks, BACnet, Johnson Controls N2 or Apogee P1 networks.



Altivar 61 Full-Featured AC Drives

The Telemecanique brand Altivar 61 Drive defines ease of use for variable speed drives used in centrifugal pump and fan applications offering the highest level of features, functions and flexibility. Its evolutionary design will reduce installation and start-up time while providing reliable operation. It is designed for OEMs, end-users and system integrators requiring an easy-to-use product with a high level of functionality and customization that is also easy to maintain. It provides connection options to the major building automation networks, including Lonworks, BACnet, Johnson Controls N2 and Apogee P1, as well as other industrial networks. The Altivar 61 Drive can be internally fitted with an option card to manage multiple pump installations and can also be fitted with the Controller Inside option board, which allows custom programming via the IEC 1131 programming methods.



S-Flex™ Enclosed Drives

Square D® S-Flex enclosed drive is for commercial pump and fan applications. Designed as an off-the-shelf product, the S-Flex Drive is an economical, yet feature rich package that includes a circuit breaker disconnect and bypass contactors. In addition, the S-Flex Drive is rated as a NEMA Type 1 general purpose enclosure and is ideal for use in residential high rise and mixed use buildings, commercial office buildings, schools and campus environments.



E-Flex™ Enclosed Drives

The Square D® E-Flex Enclosed AC Drive Controller is an efficient and economical enclosed solution for commercial and industrial HVAC, pump and fan applications. The E-Flex Enclosed Drive features the new Telemecanique Altivar 61 AC Drive on the inside and provide 100kAIC rating with a circuit breaker and with an option for by-pass contactors. Built to conform to IBC and ASCE seismic standards for ground and roof-level installations, the E-Flex Enclosed Drive meets both indoor and outdoor application requirements with Type 1, Type 12/12K and Type 3R enclosures.



PowerGard™ 18-Pulse Enclosed Drives

Combining adjustable speed drive and power quality solutions for municipal and industrial pumping applications, the Square D® brand PowerGard Series C 18-Pulse Enclosed Drive Controller features the new Altivar 61 and 71 AC Drives. They are ideal for installations specifying “clean power” low harmonic content in compliance with IEEE 519 guidelines for harmonic mitigation. PowerGard 18-Pulse Drives are UL 508 listed and are available in Type 1 general purpose or with fan filter options.

Machine Builder & Industrial Process Applications

Defining ease of use, reliability and cost savings for OEMs, panel builders and system integrators and flexible, robust operation for end user installations.



Altivar 11 Nano Drives

The Altivar 11 AC Drive offers excellent drive reliability and performance in a nano-drive form factor. Additional features include adjustable switching frequencies up to 16 kHz and operation in ambient temperatures from -10°C to +50°C without derating. Developed for small machine applications, the multi-functional Altivar 11 Drives can also be configured for use as substitutes for two-speed motor applications or as replacements for DC speed control applications. The contactor style, top in – bottom out wiring and DIN rail mounting option simplify installation. Power Suite™ software connectivity allows for easy configuration of multiple units.



Altivar 31 Mini-Drives

The Altivar 31 Drive provides a unique mini-drive targeted for small machine OEMs for industrial and commercial applications. The Altivar 31 Drive's native Modbus® port can be used to integrate into a communication network. As a compact product, the Altivar 31 Drive can also take a component approach, which requires side-by-side mounting, while featuring available options to meet specific target market requirements or specifications.



Altivar 71 Full-Featured AC Drives

The Altivar 71 AC Drive is designed for the control of 3-phase asynchronous motors and synchronous constant torque applications. Offering increased functionality and adaptable control protocols, it simplifies user interface with an easy-to-read display and navigation wheel that allows users to scroll through drop-down menus. The Altivar 71 Drive simplifies complex applications with customizable capability and can be internally fitted with the Controller Inside option board which allows custom programming via the IEC 1131 programming methods. Reliable, expandable and easy to control, it saves machine builders, panel builders and system integrators time and money.



M-Flex™ and MCC Enclosed Drives

The Square D® brand M-Flex and MCC Enclosed Drives Controllers provide a robust, adjustable-speed solution for government, hospitals, universities, pharmaceutical, industrial facilities and municipal pumping applications. These enclosed packages feature the Altivar 61 and Altivar 71 AC drives and are available in Type 1 general purpose or Type 12/12K drip- and dust-proof environmental enclosures in integrated or barriered designs.



Altistart® 01, Altistart 48 and Enclosed 48 Soft Starts

Altistart 01 Soft Start
This mini soft start ensures a smooth and controlled motor and equipment start while providing torque surge suppression. This highly functional solution can decrease maintenance and increase up-time by preventing mechanical shocks.

Altistart 48 Soft Start
Full-featured soft start that offers unique torque control on starting and stopping. This patented Torque Control System reduces mechanical stress on equipment and reduces check value maintenance found in pumping systems. It is also EGSA Class 3 Generator compliant for use on emergency/standby generators.

Enclosed 48 Soft Start
This enclosed version of the Altistart 48 Soft Start offers coordinated 100 kA short circuit current ratings with industry-leading seismic qualification for floor mounted configurations.

Panel Mounted/Open Products Solutions

Key Application/ Market Segment

Simple machines

- conveyers
- mixers
- gate control
- machine movement
- small pumps and fans
- positive displacement pumps



Starters/drives

Variable speed drives
Soft Starters and soft
start/soft stop units

Altistart 01



Altivar 11



Altivar 31



Distribution voltage ranges for 50/60 Hz line supply

Single phase 110 to 480 V
Three phase 110 to 690 V

Single phase 100 to 120 V
Single phase 200 to 240 V
Three phase 200 to 230 V

Single phase 200 to 240 V
Three phase 200 to 240 V
Three phase 380 to 500 V

Horsepower ratings for 3 phase motors

1/4 to 2 hp, 115/230 V single phase motor
1/2 to 30 hp, 208/230 V
1/2 to 60 hp, 400/480 V
30 to 75 hp, 575/600 V

1/4 to 1 hp, 115/230 V single phase input
1/4 to 3 hp, 208/230 V single phase input
1/4 to 3 hp, 208/230 V

1/4 to 3 hp, 208/230 V single phase input
1/4 to 20 hp, 208/230 V
1/2 to 20 hp, 400/480 V
1 to 20 hp, 575/600 V

Drive

Output frequency -

Equals input frequency

0.5 to 200 Hz

0 to 500 Hz

Type of control: Asynchronous motor

Reduced voltage start

Sensorless flux vector control

Sensorless flux vector control

Synchronous motor

-

-

-

Transient overtorque

-

150 to 170% of nominal
motor torque

170 to 200% of the nominal
motor torque

Functions

Number of functions

1

26

50

Number of I/O

Analog inputs

-

1

3

Logic inputs

3

4

6

Relay outputs

1

1

2

Communication

Integrated

-

-

Modbus and CANopen

Available as an option

Combined with TeSys® U-Line
self-protected starter

-

1

Gateway options for:
DeviceNet
Ethernet TCP/IP
Fipio
Profibus DP
208/230 and 400/480 V product
available with or without local control
option. Option includes speed
potentiometer, Run key and Stop key.

Cards (available as an option)

-

-

Enclosure Rating

IP20

IP20

IP20, Type 1 with optional kit

Standards and certifications

IEC/EN 60947-4/2
C-TICK - CSA - UL
CE - CCC

EN 50178, EN 61800-3
EN 55011 - EN 55022:
class B and class A gr.1
NOM 117 - C-TICK - CSA
UL - N998 - CE

EN 50178, EN 61800-3
EN 55011 - EN 55002:
class A, class B
with option
C-TICK - UL - N998 - CE CSA

Literature

8637BR0401

8800SM0101TR1/03

8800BR0401

Centrifugal pumps & fans

- pumps
- fans



Complex, high-power machines

- material handling
- high performance movement and regulation
- lifts, cranes, hoists
- extruders, shredders
- presses

Soft start/soft stop units

Altistart 48



Variable speed drives
Building (HVAC)⁽¹⁾

Altivar 21



Industry

Altivar 61



Variable speed drives
Industry

Altivar 71



Three phase 230 to 415 V
Three phase 208 to 690 V

Three phase 200 to 240 V
Three phase 380 to 480 V

Single phase 200 to 240 V
Three phase 200 to 240 V
Three phase 380 to 480 V
Three phase 525 to 600 V

Single phase 200 to 240 V
Three phase 200 to 240 V
Three phase 380 to 480 V
Three phase 525 to 600 V

2 to 1200 hp

1 to 40 hp, 208/230 V
1 to 100 hp, 400/480 V

1 to 10 hp, 208/230 V single phase input
1 to 125 hp, 208/230 V
1 to 900 hp, 400/480 V
1 to 900 hp, 575/600 V available late 2007

1 to 10 hp, 208/230 V single phase input
1/2 to 100 hp, 208/230 V
1 to 700 hp, 400/480 V
1 to 700 hp, 575/600 V available late 2007

Equals input frequency

0 to 200 Hz

0.5 to 1600 Hz up to 50 hp
0.5 to 500 Hz from 50 to 900 hp

0.5 to 1600 Hz up to 50 hp
0.5 to 500 Hz from 50 to 700 hp

Reduced voltage start and
torque control stop

Volts per hertz or sensorless flux
vector control

Volts per hertz or sensorless flux
vector control

Sensorless flux vector control

-

-

-

Vector control with or without speed feedback

-

Transient overload: 110% of the
nominal drive current for 60 seconds

Transient overload: 110 to 120%
of the nominal drive current for
60 seconds

200% of the nominal motor torque for 2 s
170% for 60 seconds

36

50

> 150

> 150

1 PTC probe

2

2-4

2-4

4

3

6-20

6-20

1

1

1-3

1-3

Modbus

Modbus

Modbus and CANopen

Modbus and CANopen

Gateway options for:
DeviceNet

APOGEE FLN (P1)*

APOGEE FLN (P1)*

Device Net

Modbus/Uni-Telway,

Ethernet TCP/IP

BACnet

BACnet

InterBus

Modbus/Uni-Telway

Ethernet TCP/IP

Modbus Plus,

Fipio

LonWorks

DeviceNet

LonWorks

Profibus DP

Fipio

Profibus DP

Profibus DP

METASYS N2

Ethernet TCP/IP

METASYS N2

Ethernet IP*

InterBus

Ethernet IP*

-

-

I/O extension cards
"Controller Inside" programmable card,
multi-pump cards

Encoder interface cards
I/O extension cards
"Controller Inside" programmable card

IP20

IP20, Type 1 with optional kit

IP20, Type 1 with optional kit

IP20, Type 1 with optional kit

IEC/EN 60947-4-2
EMC class A and B
DNV - C-TICK - GOST
CCIB - NOM - UL - CE
CCC - CSA

EN 50178, IEC/EN 61800-3
EN 55011, 55022:
class A, class B with option
CE, UL, C-TICK, N998
UL 1995 Plenum rated

IEC/EN 61800-5-1
IEC/EN 61800-3 (environments 1 and 2, C1 to C3)
EN 55011, EN 55022, UL 1995 Plenum rated
IEC/EN 61000-4-2/4-3/4-4/4-5/4-6/4-11
CE, UL, CSA, DNV, C-TICK, NOM 117, GOST

IEC/EN 61800-5-1
IEC/EN 61800-3 (environments 1 and 2, C1 to C3)
EN 55011, EN 55022
IEC/EN 61000-4-2/4-3/4-4/4-5/4-6/4-11
CE, UL, CSA, DNV, C-TICK, NOM 117, GOST

8800SM0101SR9/03

8800BR0603

8800BR0601

8800BR0505R3/06

⁽¹⁾ Heating Ventilation Air Conditioning, *Available early 2008

Enclosed & MCC packaged products

Type of motor control Key application/ market segment	Soft starts Commercial & industrial – pumps – agitators – fans – mixers – conveyors – grinders – centrifuges – crushers – lifts – presses	Adjustable speed drives Commercial HVAC & retrofits – pumps – fans	Adjustable speed drives Commercial & industrial HVAC – pumps – fans
Packaged products Integrated controls protected within enclosures, optimized with disconnect means, circuit breakers, push buttons, selector switches, control logic, communication and miscellaneous options designed to meet application requirements. Product platform	<h2 style="text-align: center;">Enclosed 48</h2>  <p style="text-align: center;">Altistart 48</p>	<h2 style="text-align: center;">S-Flex</h2>  <p style="text-align: center;">Altivar 21</p>	<h2 style="text-align: center;">E-Flex</h2>  <p style="text-align: center;">Altivar 61 (variable torque)</p>
Distribution voltage ranges for 50/60 Hz line supply	208, 240, 480, 600 vac	208, 240, 480 vac	208, 240, 480 vac
Horsepower ratings	3 to 200 hp, 208 V 5 to 250 hp, 230 V 10 to 500 hp, 480 V 15 to 600 hp, 575 V	<u>Variable torque:</u> 1 to 40 hp, 200/230 V 1 to 100 hp, 460 V	<u>Variable torque:</u> 1 to 100 hp, 460 V 1 to 50 hp, 208/230 V
Configurable options	Customizable product – non-reversing – reversing – shunt trip Extensive options	Standard product – drive with isolation/bypass Communication options	Configurable product – drive with disconnect means – drive with isolation/bypass Limited options
Enclosure ratings	Type 1 general purpose Type 12 dust/drip proof Type 3R outdoor	Type 1 general purpose	Type 1 general purpose Type 12/12K dust/drip proof Type 3R outdoor
Communication	Modbus (native) Modbus Plus Ethernet TCP/IP (gateway) DeviceNet (gateway)	Modbus RJ45 (included as standard) BACnet LonWorks Metasys N2 Apogee FLN (P1)*	APOGEE FLN (P1)* † †BACnet †MetSYS N2 Ethernet TCP/IP †Modbus Plus LonWorks Profibus DP
Standards and certifications	UL 508 cUL/CSA Seismic qualification ICC ES AC156 acceptance test protocol	UL 508A Seismic qualification ICC ES AC156 acceptance test protocol	UL 508C cUL Seismic qualification ICC ES AC156 acceptance test protocol
Literature	8800BR0402R9/04	8839BR0501R8/07	8800BR0501R5/06

**Adjustable speed drives
Commercial, industrial,
water/wastewater, strategic accounts**

- aggregates
- government
- healthcare
- schools
- industrial facilities
- manufacturing process
- municipal pumping
- pharmaceutical

M-Flex



Altivar 61 (variable torque)
Altivar 71 (constant torque)

208, 240, 480 vac

Variable torque:
1 to 500 hp, 460 V
1 to 50 hp, 208/230 V
Constant torque:
1 to 450 hp, 460 V
1 to 40 hp, 208/230 V

- Customizable product
- drive with disconnect means
 - drive with integrated bypass
 - drive with barriered bypass
 - drive with reduced voltage bypass
 - drive with soft start bypass

Extensive options

Type 1 general purpose
Type 1G general purpose with gasketing
Type 12/12K dust/drip proof

APOGEE FLN (P1)* †

†BACnet	†LonWorks
DeviceNet	†MetSYS N2
EtherNet TCP/IP	Modbus/Unitelway
FIPIO	Modbus Plus
Interbus S	Profibus DP

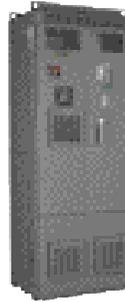
UL 508A
UL 508C
cUL
Seismic qualification ICC ES AC156
acceptance test protocol

8800BR0602

**Adjustable speed drives (18-Pulse)
Industrial, water/wastewater,
strategic accounts**

- clean power technology
- high horsepower
- process control applications
- fans

PowerGard Series C



Altivar 61 (variable torque)
Altivar 71 (constant torque)

480 vac

Variable torque:
50 to 500 hp, 460 V
Constant torque:
40 to 450 hp, 460 V

- Customizable product
- drive with disconnect means
 - drive with integrated bypass
 - drive with barriered bypass
 - drive with reduced voltage bypass
 - drive with soft start bypass
 - soft start with options

Extensive options

Type 1 general purpose
Type 1B general purpose with fan filters

APOGEE FLN (P1)* †

†BACnet	†LonWorks
DeviceNet	†MetSYS N2
EtherNet TCP/IP	Modbus/Unitelway
FIPIO	Modbus Plus
Interbus S	Profibus DP

UL 508A
UL 508C
cUL
Seismic qualification ICC ES AC156
acceptance test protocol

8839BR0502R11/06

**Soft starts & adjustable speed drives
Industrial, water/wastewater,
strategic accounts**

- high density construction
- pumps
- fans
- intelligent networking

**Model 6 motor
control center**



Altstart 48
Altivar 61 (variable torque)
Altivar 71 (constant torque)

208, 240, 480, 600 vac

<u>Variable torque:</u>	<u>Constant torque:</u>
1 to 500 hp, 460 V	1 to 450 hp, 460 V
1 to 50 hp, 208/230 V	1 to 40 hp, 208/230 V

Soft start:
3 to 200 hp, 208 V
5 to 250 hp, 230 V
10 to 500 hp, 480 V
15 to 600 hp, 575 V

- Customizable product
- drive with disconnect means
 - drive with integrated bypass
 - drive with barriered bypass
 - drive with reduced voltage bypass
 - drive with soft start bypass

Extensive options

Type 1 general purpose, Type 1 gasketed
Type 12/12K dust/drip proof
Type 3R outdoor

APOGEE FLN (P1)* †

†BACnet	†LonWorks
DeviceNet	†MetSYS N2
EtherNet TCP/IP	Modbus/Unitelway
FIPIO	Modbus Plus
Interbus S	Profibus DP

UL 845
CSA
NOM
Seismic qualification ICC ES AC156
acceptance test protocol

8998H00003R6/05

† Available with Altivar 61 based product



A worldwide presence

Schneider Electric is a global supplier of electrical distribution, automation and control equipment products under the brand names of Square D, Telemecanique® and Merlin Gerin®. Backed by a global organization of 90,000 employees in 190 countries, Schneider Electric is a global electrical industry leader. With one of the strongest distribution networks in the U.S. and around the world, you can count on Schneider Electric to keep your business running smoothly and efficiently.

Experienced

For over 100 years, Schneider Electric has been an innovator in manufacturing products that are tailored to the demanding specifications of our customers. Schneider Electric began incorporating electronic components into its motor control products to improve performance and reliability in the early 1960s and has been providing adjustable frequency drives and soft start solutions for over 30 years for a variety of customers and applications, including:

- OEM machine builders
- Control panel builders
- System Integrators
- Building owners
- Industrial end-users
- Infrastructure projects

Focused on your needs

Schneider Electric has made a significant investment in research and development to design a new generation of AC drives and soft start products for variable torque applications such as centrifugal pumps and fans and constant torque applications which include material handling, hoisting, conveying, packaging and process machines.

Schneider Electric can provide you with a wide range of solutions for pump and fan applications that will:

- Reduce your energy costs
- Improve up-time by spending less time installing and configuring, providing advanced diagnostics, industry leading voltage ride thru capability and seismic qualified products.
- Providing just the right solution to meet your harmonic requirements

Schneider Electric can provide you with a wide range of high performance solutions for your constant torque applications. Our core competencies are:

- Motor control software
- AC drive and soft start design
- Knowledge of electrical power distribution
- Quality assurance in our manufacturing facilities that provides you peace of mind when installing Schneider Electric solutions.

Let Schneider Electric put these capabilities to work for you.

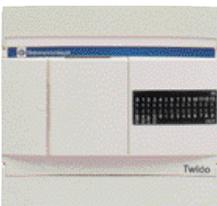
Simply Smart.

TURN IT ON



Simply Smart!

Leveraging ingenuity and intelligence for ease of use



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