

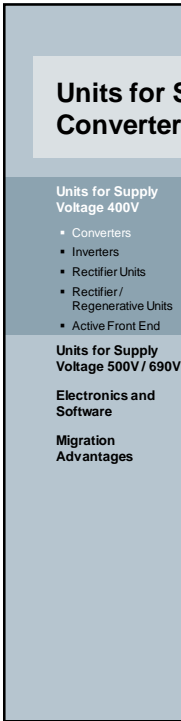





## Migration of MASTERDRIVES to SINAMICS G/S

Units for Supply Voltage 400V
Units for Supply Voltage 500V / 690V
Electronics and Software
Migration Advantages

Unrestricted





## Units for Supply Voltage 400V Converters – 1Q / 6 pulse

**Units for Supply Voltage 400V**


- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

**Units for Supply Voltage 500V / 690V**

Electronics and Software


Migration Advantages

**Compact PLUS Units**




**0.55 - 15 kW**

**Compact Units**



**2.2 - 37 kW**


**Chassis Units**



**45 - 400 kW**


**0.37 - 90 kW**

**S120 PM, Blocksize + CU310**




**0.37 - 90 kW**

**G120 Power Modules, Blocksize**




**110 - 560 kW**

**G130 Power Modules, Chassis**



**110 - 250 kW**

**S120 PM, Chassis + CU310**



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## Units for Supply Voltage 400V Converters – 1Q / 6 pulse

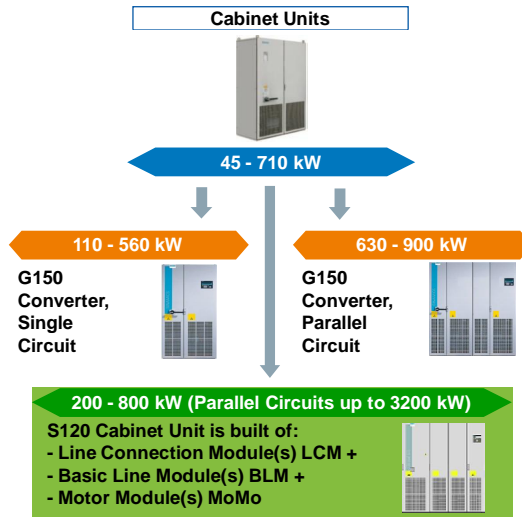
### Units for Supply Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

### Units for Supply Voltage 500V / 690V

### Electronics and Software

### Migration Advantages



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## Units for Supply Voltage 400V Converters – 1Q / 12 pulse

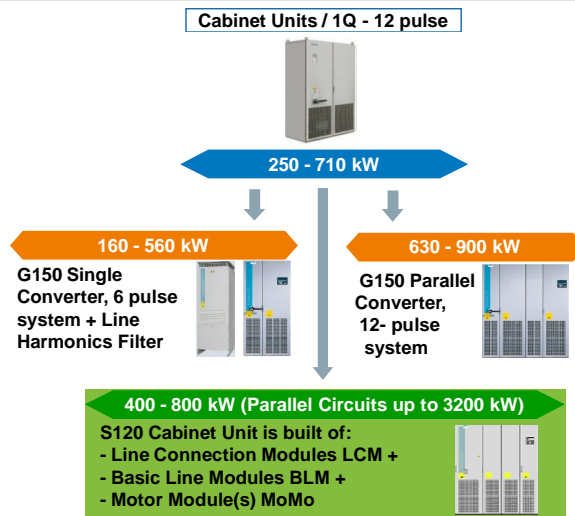
### Units for Supply Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

### Units for Supply Voltage 500V / 690V

### Electronics and Software

### Migration Advantages



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Units for Supply Voltage 400V  
Converters – 4Q / 6 pulse

- Units for Supply Voltage 400V
  - Converters
  - Inverters
  - Rectifier Units
  - Rectifier / Regenerative Units
  - Active Front End
- Units for Supply Voltage 500V / 690V
- Electronics and Software
- Migration Advantages

Cabinet Units / 4Q - 6 pulse



45- 710 kW

250 - 800 kW (Parallel Circuits up to 3200 kW)

S120 Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- Smart Line Module(s) SLM +  
- Motor Module(s) MoMo



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Units for Supply Voltage 400V  
Converters – 4Q with AFE

- Units for Supply Voltage 400V
  - Converters
  - Inverters
  - Rectifier Units
  - Rectifier / Regenerative Units
  - Active Front End
- Units for Supply Voltage 500V / 690V
- Electronics and Software
- Migration Advantages

Cabinet Units with AFE self-commutated pulsed rectifier/regenerative unit



45- 710 kW

110 - 800 kW

S150 Converter Cabinet Unit with self – commutated rectifier/regenerative unit (Active Infeed = AFE)



132 - 800 kW (Parallel Circuits up to 3200 kW)

S120 Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- ALM(s) plus AIM(s) +  
- Motor Module(s) MoMo



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## Units for Supply Voltage 400V Inverters

Units for Supply  
Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

Compact  
PLUS Units



0.75 - 37 kW

Compact Units



2.2 - 37 kW

Chassis Units



45 - 710 kW (a)

0.9 - 9.7 kW

S120 MoMo,  
Booksize  
Compact



1.6 - 107 kW

S120  
MoMo,  
Booksize



110 - 800 kW (b)

S120 Motor  
Modules,  
Chassis



Cabinet  
Modules



a) Multi-parallel Circuits up to 3200kW  
b) Parallel Circuits (4x) up to 3200kW

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## Units for Supply Voltage 400V Rectifier Units – 1Q

Units for Supply  
Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

Basic Line  
Modules,  
Chassis

Basic Line  
Modules,  
Cabinet  
Modules

Compact  
PLUS Units



15 - 37 kW

Compact Units



15 - 100 kW

Chassis Units



75 - 800 kW (a)

20 - 100 kW

S120 Basic  
Line  
Modules,  
Booksize



200 - 710 kW (b)

S120 Basic  
Line Modules,  
Chassis



200 - 900 kW (c)

S120 Basic  
Line Modules,  
Cabinet  
Modules



a) Parallel Circuits up to 2400kW  
b) Parallel Circuits up to 2800kW  
c) Parallel Circuits up to 3600kW

Industry Sector MC PM BD / LD I M PM1

Unrestricted

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## Units for Supply Voltage 400V Rectifier – 4Q Regenerative Units

Units for Supply  
Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier/  
Regenerative Units
- Active Front End

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

### Compact Units



7.5 - 37 kW



5 - 36 kW

S120 Smart  
Line Modules,  
Booksize



Booksize  
Compact

- a) Parallel Circuits up to 2400kW  
b) Parallel Circuits up to 3200kW

### Chassis Units



75 - 800 kW (a)



250 - 800 kW (b)

S120 Smart  
Line Modules,  
Chassis



250 - 800 kW (b)

S120 Smart  
Line Modules,  
Cabinet  
Modules



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## Units for Supply Voltage 400V Active Front End Units AFE

Units for Supply  
Voltage 400V

- Converters
- Inverters
- Rectifier Units
- Rectifier/  
Regenerative Units
- Active Front End

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

### Compact Units



6.8 - 49 kW (a)



16 - 120 kW

S120 ALM and  
AIM,  
Booksize



- a) Supply Connection Module =  
Basic Interference Suppression +  
Clean Power Filter  
b) Parallel Circuits up to 3600kW

### Chassis Units



AFE with  
Supply  
Connection  
Module

63 - 250 kW



250 - 800 kW (b)

S120 ALM  
and AIM,  
Chassis



250 - 800 kW (b)




S120 ALM  
and AIM,  
Cabinet  
Modules



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Unrestricted

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Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

Electronics and Software

Migration Advantages

Unrestricted



Units for Supply Voltage 500V / 690V  
Converters 500V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software

Migration Advantages


**Converters 500 V**

- Booksize
- Chassis
- 1Q / 6-pulse

↓

**G130 Power Modules + CU320**

**500 V (3 AC 500...600 V) Compact Units**




2.2 - 30 kW

↓

Use isolating transformer and converters 400 V

**500 V (3 AC 500...600 V) Chassis Units**




37 - 315 kW

↓

110 - 560 kW

**G130 Power Modules, Chassis**



3 AC 500...600 V

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Industry Sector MC PM BD / LD I M PM1

Unrestricted

## Units for Supply Voltage 500V / 690V Converters 500V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software  
Migration Advantages

**Converters 500 V**  
- Cabinets  
1Q / 6-pulse

**G150**  
Cabinets  
1Q / 6-pulse  
500 V

**S120**  
Cabinet  
Modules  
500 – 690 V

Cabinet Units / Single-quadrant operation  
6-pulse system

37 - 1100 kW

110 - 560 kW

G150  
Converter,  
Single  
Circuit

630 - 1000 kW

G150  
Converter,  
Parallel  
Circuit

180 - 900 kW @ 500 V (Parallel Circuits up to 3600 kW)

Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- Basic Line Module(s) BLM +  
- Motor Module(s) MoMo

Industry Sector MC PM BD / LD I M PM1

Unrestricted

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## Units for Supply Voltage 500V / 690V Converters 500V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software  
Migration Advantages

**Converters 500 V**  
- Cabinets  
1Q / 12-pulse

**G150**  
Cabinets  
- 1Q / 6-pulse +  
LHF  
- 1Q / 12-pulse  
500 V

**S120**  
Cabinet  
Modules  
500 – 690 V

Cabinet Units / Single-quadrant operation  
12-pulse system

200 - 1100 kW

110 - 560 kW

Single Converter,  
6-pulse system  
+  
Line Harmonics Filter

630 - 1000 kW

Parallel  
Converter,  
12-pulse  
system

360 - 900 kW @ 500 V (Parallel Circuits up to 3600 kW)

Cabinet Unit is built of:  
- Line Connection Modules LCM +  
- Basic Line Modules BLM +  
- Motor Module(s) MoMo

Industry Sector MC PM BD / LD I M PM1

Unrestricted

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## Units for Supply Voltage 500V / 690V Converters 500V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and  
Software

Migration  
Advantages

**Converters  
500 V**  
- Cabinets  
4Q / 6-pulse



**S120  
Cabinet  
Modules  
500 – 690 V**

**Cabinet Units / Four-quadrant operation  
6-pulse system**

37 - 1100 kW



**325 - 900 kW @ 500 V (Parallel Circuits up to 3600 kW)**

Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- Smart Line Module(s) SLM +  
- Motor Module(s) MoMo



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## Units for Supply Voltage 500V / 690V Converters 500V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and  
Software

Migration  
Advantages

**Converters  
500 V**  
- Cabinets  
with AFE (4Q)



**S150 (4Q)  
Cabinet Units  
with  
Active Infeed  
500 – 690 V**

**S120  
Cabinet  
Modules  
500 – 690 V**

**Cabinet Units with AFE self-commutated  
pulsed rectifier/regenerative unit**



37 - 900 kW

55 - 900 kW @ 500V

**S150  
Converter Cabinet Unit  
with self - commutated  
rectifier/regenerative unit**



**400 - 1000 kW @ 500V (Parallel Circuits up to 4000 kW)**

Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- ALM(s) plus AIM(s) +  
- Motor Module(s) MoMo



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Industry Sector MC PM BD / LD I M PM1  
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## Units for Supply Voltage 500V / 690V Converters 690V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Electronics and  
Software  
Migration  
Advantages

**Converters  
690 V  
- Chassis  
1Q / 6-pulse**

**G120  
Power  
Modules  
+ CU240** | **G130  
Power  
Modules  
+ CU320**

**7.5 - 37 kW**  
G120  
Power  
Modules,  
Blocksize

**690 V  
(3 AC 660...690 V)  
Chassis Units**

**55 - 400 kW**

**75 - 800 kW**  
G130  
Power  
Modules,  
Chassis

**3 AC  
660...690 V**

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Industry Sector MC PM BD / LD I M PM1

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## Units for Supply Voltage 500V / 690V Converters 690V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Electronics and  
Software  
Migration  
Advantages

**Converters  
690 V  
- Cabinets  
1Q / 6-pulse**

**G150  
Cabinets  
1Q / 6-pulse  
690 V**

**S120  
Cabinet  
Modules  
500 - 690 V**

**Cabinet Units / Single-quadrant operation  
6-pulse system**

**55 - 1500 kW**

**75 - 800 kW**  
G150  
Converter,  
Single  
Circuit

**1000 - 1500 kW**  
G150  
Converter,  
Parallel  
Circuit

**250 - 1200 kW @ 690 V (Parallel Circuits up to 4800 kW)**  
Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- Basic Line Module(s) BLM +  
- Motor Module(s) MoMo

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Industry Sector MC PM BD / LD I M PM1

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## Units for Supply Voltage 500V / 690V Converters 690V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Electronics and  
Software

Migration  
Advantages

**Converters  
690 V**  
- Cabinets  
1Q / 12-pulse

**G150  
Cabinets**  
- 1Q / 6-pulse +  
LHF  
- 1Q / 12-pulse  
690 V

**S120  
Cabinet  
Modules**  
500 – 690 V

**Cabinet Units / Single-quadrant operation  
12-pulse system**

250 - 1500 kW

160 - 800 kW

Single Converter,  
6-pulse system  
+  
Line Harmonics Filter

1000 - 1500 kW

Parallel  
Converter,  
12-pulse  
system

500 - 1200 kW @ 690 V (Parallel Circuits up to 4800 kW)

Cabinet Unit is built of:  
- Line Connection Modules LCM +  
- Basic Line Modules BLM +  
- Motor Module(s) MoMo



Industry Sector MC PM BD / LD I M PM1

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## Units for Supply Voltage 500V / 690V Converters 690V

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier /  
Regenerative Units
- Active Front End

Electronics and  
Software

Migration  
Advantages

**Converters  
690 V**  
- Cabinets  
4Q / 6-pulse

**S120  
Cabinet  
Modules**  
500 – 690 V

**Cabinet Units / Four-quadrant operation  
6-pulse system**

55- 1500 kW

650 - 1200 kW @ 690 V (Parallel Circuits up to 4800 kW)

Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- Smart Line Module(s) SLM +  
- Motor Module(s) MoMo



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## Units for Supply Voltage 500V / 690V Converters 690V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software

Migration Advantages

**Converters 690 V**  
- Cabinets with AFE (4Q)

**S150 (4Q) Cabinet Units with Active Infeed 500 – 690 V**

**S120 Cabinet Modules 500 – 690 V**

Cabinet Units with AFE self-commutated pulsed rectifier/regenerative unit

55 - 1200 kW



75 – 1200 kW @ 690V

**S150 Converter Cabinet Unit with self – commutated rectifier/regenerative unit**



560 - 1400 kW @ 690V (Parallel Circuits up to 5600 kW)

Cabinet Unit is built of:  
- Line Connection Module(s) LCM +  
- ALM(s) plus AIM(s) +  
- Motor Module(s) MoMo



Industry Sector MC PM BD / LD I M PM1

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## Units for Supply Voltage 500V / 690V Inverters 500 – 690V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software

Migration Advantages

**Inverters 500V / 690V**  
- Booksize  
- Chassis

**500 V (3 AC 500...600 V) Compact Units**



2.2 - 30 kW

**500 V (3 AC 500...600 V) Chassis Units**



37- 900 kW 1a)

**690 V (3 AC 660...690 V) Chassis Units**



55 – 1200 kW 1b)

**S120 Motor Modules + CU320 500 – 690 V**

Use isolating transformer and 400V rectifiers/inverters

55 – 900 kW @ 500V 2a)  
75 – 1200 kW @ 690V 2b)

**Motor Modules, Chassis 3 AC 500...690 V**



**Motor Modules, Cabinet Modules 3 AC 500...690 V**



- 1a) Multi-parallel Circuits up to 4500kW @ 500V  
1b) Multi-parallel Circuits up to 6000kW @ 690V  
2a) Parallel Circuits (4x) up to 3600kW @ 500V  
2b) Parallel Circuits (4x) up to 4800kW @ 690V

Industry Sector MC PM BD / LD I M PM1

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## Units for Supply Voltage 500V / 690V Rectifier Units 500 – 690V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software  
Migration Advantages

**Rectifier Units (1Q)**  
500V / 690V  
- Booksize  
- Chassis

500V  
(3 AC 500...600 V)  
Compact Units

22 – 55 kW

500V  
(3 AC 500...600 V)  
Chassis Units

75 – 1100 kW 1a)

690V (3 AC 660...690 V) Chassis Units  
160 – 1500 kW 1b)

**S120**  
Basic Line  
Modules  
BLM  
500 – 690V

Use isolating transformer  
and 400V rectifiers/inverters

- 1a) Parallel Circuits up to 3300kW @ 500V
- 1b) Parallel Circuits up to 4500kW @ 690V
- 2a) Parallel Circuits up to 3200kW @ 500V
- 2b) Parallel Circuits up to 4400kW @ 690V
- 3a) Parallel Circuits up to 4400kW @ 500V
- 3b) Parallel Circuits up to 6000kW @ 690V

180 – 800 kW @ 500V 2a)  
250 – 1100 kW @ 690V 2b)  
Basic Line  
Modules,  
Chassis  
3 AC 500...690 V

180 – 1100 kW @ 500V 3a)  
250 – 1500 kW @ 690V 3b)  
Basic Line  
Modules,  
Cabinet Modules  
3 AC 500...690 V

Industry Sector MC PM BD / LD I M PM1  
Unrestricted

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## Units for Supply Voltage 500V / 690V Rectifier / Regenerative Units 500 – 690V

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

- Converters
- Inverters
- Rectifier Units
- Rectifier / Regenerative Units
- Active Front End

Electronics and Software  
Migration Advantages

**Rectifier / Regenerative Units (4Q)**  
500V / 690V  
- Booksize  
- Chassis

500V  
(3 AC 500...600V)  
Compact Units

11 – 55 kW

500V  
(3 AC 500...600V)  
Chassis Units

90 – 1100 kW 1a)

690V (3 AC 660...690V) Chassis Units  
110 – 1500 kW 1b)

**S120**  
Smart Line  
Modules  
SLM  
500 – 690V

Use isolating transformer  
and 400V rectifiers/inverters

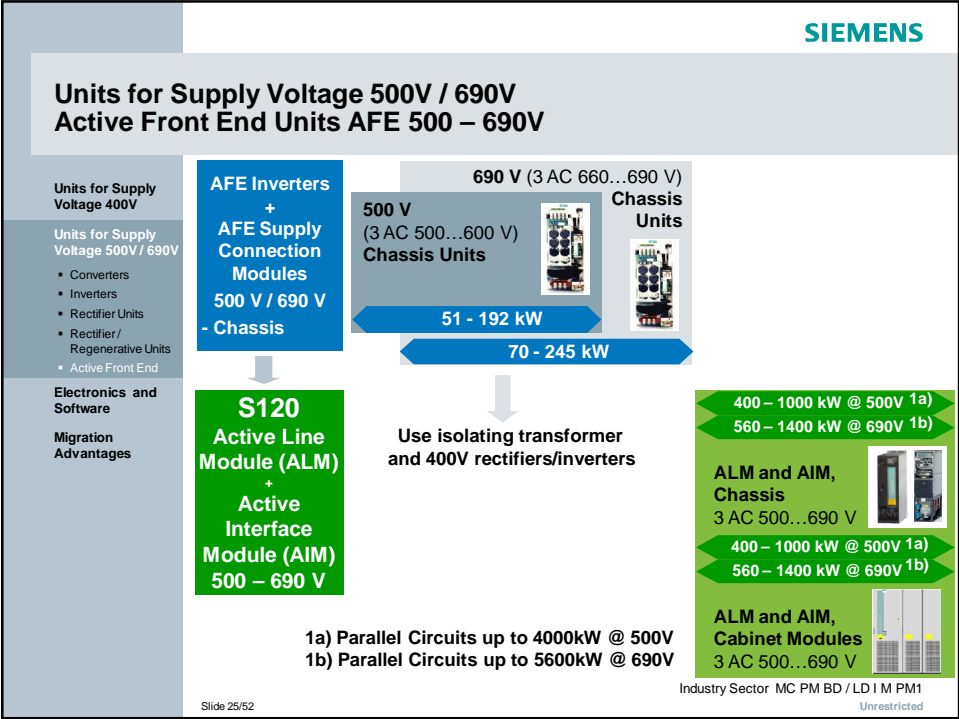
- 1a) Parallel Circuits up to 3300kW @ 500V
- 1b) Parallel Circuits up to 4500kW @ 690V
- 2a) Parallel Circuits up to 4000kW @ 500V
- 2b) Parallel Circuits up to 5600kW @ 690V

325 – 1000 kW @ 500V 2a)  
450 – 1400 kW @ 690V 2b)  
Smart Line  
Modules,  
Chassis  
3 AC 500...690V



325 – 1000 kW @ 500V 2a)  
450 – 1400 kW @ 690V 2b)  
Smart Line  
Modules,  
Cabinet Modules  
3 AC 500...690V

Industry Sector MC PM BD / LD I M PM1  
Unrestricted

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**SIEMENS**



**Units for Supply Voltage 400V**

**Units for Supply Voltage 500V / 690V**

**Electronics and Software**

**Migration Advantages**

Unrestricted

## Electronics and Software Drive Control Modes

Units for Supply  
Voltage 400V  
Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration  
Advantages

### Converters

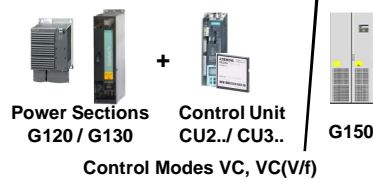
#### Vector Control



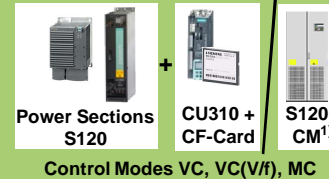
#### Motion Control



### SINAMICS G



### SINAMICS S



1) SINAMICS S120 Cabinet Modules

Industry Sector MC PM BD / LD I M PM1

Unrestricted

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## Electronics and Software Drive Control Modes

Units for Supply  
Voltage 400V  
Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration  
Advantages

### Inverters

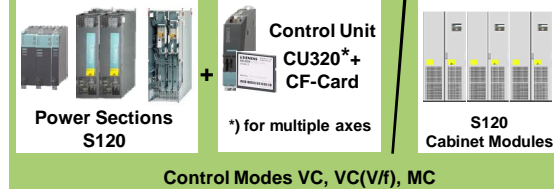
#### Vector Control



#### Motion Control



### SINAMICS S



Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Drive Control Boards

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration  
Advantages

### MASTERDRIVES VC

Drive Control Board VC (V/f)

Drive Control Board VC+ (V/f)

### SINAMICS G

**Drive Control Mode Vector (V/f)**  
Replaces the VC(V/f) control mode of MASTERDRIVES with focus on sensorless vector control and also vector control with incremental encoder

Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Drive Control Boards

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration  
Advantages

### MASTERDRIVES VC

Drive Control Board VC (V/f)

Drive Control Board VC+ (V/f)

### MASTERDRIVES MC

Drive Control Board MC

Drive Control Board MC+

Drive Control Board MCPM

Drive Control Board MCP2

Drive Control Board MCP2+

### SINAMICS S120

**Drive Control Mode Vector (V/f)**  
Replaces the VC(V/f) control mode of MASTERDRIVES 1:1 and offers even more functionality

CU320 for  
DC-AC  
Drives

CU310 for  
AC-AC  
Drives

**Drive Control Mode Servo**  
Replaces the MC control mode of MASTERDRIVES 1:1 and offers even more functionality

Industry Sector MC PM BD / LD I M PM1

Unrestricted

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## Electronics and Software Communication

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit

Standard:

SST1 → USS-Protocol  
SST2 → USS-Protocol

Options:

SCB2 → Peer-to-Peer

CBP2 → PROFIBUS

CBC → CAN Bus

SLB → Simolink

### SINAMICS G130 / G150

CU320

PROFIBUS on-board

CBC10

CBE20

PROFINET

Profibus or Profinet

Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Communication

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit

Standard:

SST1 → USS-Protocol  
SST2 → USS-Protocol

Options:

SCB2 → Peer-to-Peer

CBP2 → PROFIBUS

CBC → CAN Bus

SLB → Simolink

### SINAMICS S120

DC-AC

CU320

CU310

PB

PROFIBUS on-board

CBC10

CBE20

CU310

PN

PROFINET

Profibus or Profinet used for axes synchronization

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Electronics and Software  
Communication / Operator Panel

Units for Supply  
Voltage 400V  
Units for Supply  
Voltage 500V / 690V

- Electronics and Software
- Drive Control
  - Communication
  - Interface and I/O Boards
  - Sensor Modules
  - Technology
  - Engineering Tools
- Migration Advantages

MASTERDRIVES  
Operator Panel

OP1S



For single-axis converters  
SINAMICS G130 / G150 / S150 :

Advanced Operator Panel

AOP30

Comfortable operator panel for  
Commissioning  
Monitoring  
Fault processing



Industry Sector MC PM BD / LD I M PM1  
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Electronics and Software  
I/O Boards

Units for Supply  
Voltage 400V  
Units for Supply  
Voltage 500V / 690V

- Electronics and Software
- Drive Control
  - Communication
  - Interface and I/O Boards
  - Sensor Modules
  - Technology
  - Engineering Tools
- Migration Advantages

MASTERDRIVES Basic Unit

Expansion board  
EB1 (-Z5x)

Expansion board  
EB2 (-Z6x)

Interface board SC12/SCB1

16 Binary inputs,  
5 Binary outputs  
7 Relay outputs

Interface board SC11/SCB1

10 Binary inputs,  
1 Binary outputs,  
7 Relay outputs,  
3 Analog inputs,  
3 Analog outputs

SINAMICS G130 / G150 mit CU320

Terminal Board TB30  
4 DI, 4 DO, 2 AI, 2 AO

Terminal Module TM31  
8 Binary inputs,  
4 Binary inputs / outputs,  
2 Relay outputs,  
2 Analog inputs,  
2 Analog outputs,  
1 Temperature input (KTY/PTC)

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## Electronics and Software I/O Boards

Units for Supply  
Voltage 400V  
  
Units for Supply  
Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit

Expansion board  
EB1 (-Z5x)

Expansion board  
EB2 (-Z6x)

### Interface board SCI2/SCB1

16 Binary inputs,  
5 Binary outputs,  
7 Relay outputs

### Interface board SCI1/SCB1

10 Binary inputs,  
1 Binary outputs,  
7 Relay outputs,  
3 Analog inputs,  
3 Analog outputs

### SINAMICS S120 mit CU320

**Terminal Board TB30**  
4 DI, 4 DO, 2 AI, 2 AO

**Terminal Module TM31**  
8 Binary inputs,  
4 Binary inputs / outputs,  
2 Relay outputs,  
2 Analog inputs,  
2 Analog outputs,  
1 Temperature input (KTY/PTC)

**Terminal Module TM15**  
24 Binary inputs / outputs

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Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Sensor Modules

Units for Supply  
Voltage 400V  
  
Units for Supply  
Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit with optional boards:

Option board for  
resolvers SBR1/2

Option board for  
encoders SBM/SBM2

Option board for  
incremental encoders  
SBP (-Z1x)

**Digital Tachometer Interface  
DTI for HTL- and TTL-encoders**

### SINAMICS G / DRIVE-CLiQ Components:

**Sensor Module Cabinet-Mounted  
SMC30 for HTL- and TTL-encoders,**

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Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Sensor Modules

Units for Supply  
Voltage 400V  
  
Units for Supply  
Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit with optional boards:

Option board for  
resolvers SBR1/2

Option board for  
encoders SBM/SBM2

Option board for  
incremental encoders  
SBP (-Z1x)

Digital Tachometer Interface  
DTI for HTL- and TTL-encoders

### SINAMICS S / DRIVE-CLiQ Components:

Sensor Module Cabinet-Mounted  
**SMC10** for Resolvers

Sensor Module Cabinet-Mounted  
**SMC20** für Incremental encoders,  
Absolute-value encoders EnDat,  
SSI-encoders

Sensor Module Cabinet-Mounted  
**SMC30** for HTL- and TTL-encoders,  
SSI-encoders without increments

As an alternative to these cabinet mounted  
modules, the **motor integrated sensor**  
modules **SMI10**, **SMI20** or **SMI30** may be used.

Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Technology

Units for Supply  
Voltage 400V  
  
Units for Supply  
Voltage 500V / 690V

### Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

### Migration Advantages

### MASTERDRIVES Basic Unit

EPos

Free Function Blocks

Technology board **T100**  
Control, arithmetic and logic  
software modules

Technology boards  
**T300 / T400**  
Positioning, synchronous  
operation, center winders,  
multi-axes-drives

Technology SW **F01** (only  
for MASTERDRIVES MC)

1)

2)

1) If only a minor part of the Free Function Blocks  
of MASTERDRIVES was used

2) If a mayor part of the Free Function Blocks  
of MASTERDRIVES was used

Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Technology

Units for Supply Voltage 400V  
Units for Supply Voltage 500V / 690V

Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration Advantages

### MASTERDRIVES Basic Unit

EPos

Free Function Blocks

Technology board T100  
Control, arithmetic and logic software modules

Technology boards T300 / T400  
Positioning, synchronous operation, center winders, multi-axes-drives

Technology SW F01 (only for MASTERDRIVES MC)

### SINAMICS S120

Positioning Software (EPos)

SINAMICS DCC  
(Drive Control Chart = Function block library *plus* CFC Editor)

### SIMOTION D

SIMOTION DCC

Motion Control Programming

Industry Sector MC PM BD / LD I M PM1

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## Electronics and Software Engineering Tools

Units for Supply Voltage 400V  
Units for Supply Voltage 500V / 690V

Electronics and Software

- Drive Control
- Communication
- Interface and I/O Boards
- Sensor Modules
- Technology
- Engineering Tools

Migration Advantages

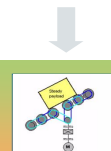
### Configuration

### Commissioning

### TIA Integration

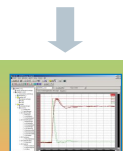
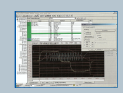
### Technology Programming

#### Pfad PLUS



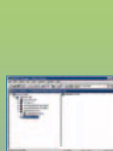
SIZER

#### DriveMonitor



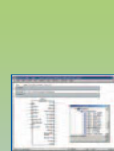
STARTER

#### Drive ES Basic



Drive ES Basic

#### Drive ES SIMATIC/PCS7



Drive ES SIMATIC/PCS7

#### Free Fct. Blocks + Drive ES Graphic





DCC SINAMICS


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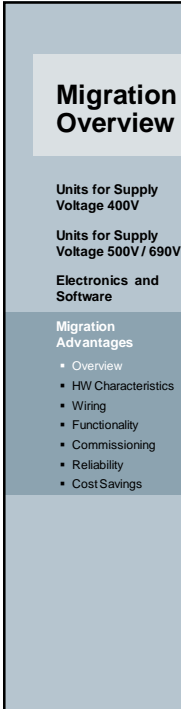







Units for Supply Voltage 400V
Units for Supply Voltage 500V / 690V
Electronics and Software
Migration Advantages

Unrestricted





### Migration Advantages Overview

Topic	SINAMICS Advantages
Hardware Characteristics	<ul style="list-style-type: none"> <li>▪ SINAMICS units are in general more compact</li> <li>▪ Power Block concept of Chassis Units simplifies repair of power sections</li> <li>▪ New cooling options (external air, cold-plate) allow for new cabinet designs</li> <li>▪ 100% output voltage of Rectifier/Regenerative Units omits autotransformer</li> </ul>
Wiring	<ul style="list-style-type: none"> <li>▪ Significantly less Profibus cabling thanks to the central Control Unit CU320</li> <li>▪ Unified and easy wiring with Drive-CLiQ</li> </ul>
Functionality SINAMICS S	<ul style="list-style-type: none"> <li>▪ Positioning: More functionality and graphical parameter setting</li> <li>▪ Free function blocks: Expanded functionality, graphical parameter setting</li> <li>▪ High End Motion Control with Simotion D</li> <li>▪ Numerous Safety Functions</li> </ul>
Commissioning	<ul style="list-style-type: none"> <li>▪ Electronic rating plates allow for an automatic initial commissioning</li> <li>▪ Fast comm. for serial machines: One Memory Card for multiple drives</li> </ul>
Availability	<ul style="list-style-type: none"> <li>▪ Efficient trouble shooting with central diagnostics for all components</li> <li>▪ Faster component swapping with Memory Card</li> <li>▪ Rectifier/Regenerative Units are protected against commutation faults</li> </ul>
Cost Savings	<ul style="list-style-type: none"> <li>▪ Many HW components are omitted, such as optional boards, Profibus cables and connectors, external safety components</li> <li>▪ Cost savings through optimized configurations for multi-axes-drives</li> </ul>

Units for Supply Voltage 400V

Units for Supply Voltage 500V / 690V

Electronics and Software

Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

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## Migration Advantages

### Reduced Size (SINAMICS G drives are usually more compact)

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

#### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

#### Example 1: Chassis 110 kW



100%

64%



Chassis Unit FSG  
**Converter 110 kW**  
400 V / 210 A

Power Module G130  
**Converter 110 kW**  
400 V / 210 A

#### Example 2: Chassis 250 kW



100%

40%



Chassis Unit FSK  
**Converter 250 kW**  
400 V / 510 A

Power Module G130  
**Converter 250 kW**  
400 V / 490 A

#### Example 3: Cabinet Unit 315 kW



100%

80%



Cabinet Unit  
**Converter 6-pulse 1Q**  
315 kW / 400V / 590A

Cabinet Unit G150  
**Converter 6-pulse 1Q**  
315 kW / 400V / 605A

#### Example 4: Cabinet Unit 800 kW



100%

57%



Cabinet Unit  
**Converter 6-pulse 1Q**  
800 kW / 690V / 860A

Cabinet Unit G150  
**Converter 6-pulse 1Q**  
800 kW / 690V / 810A

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## Migration Advantages

### Reduced Size (SINAMICS S drive systems are usually more compact)

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

#### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

#### Example 1: 4 axes, 10A each



100%

65%



Compact PLUS Units  
**Rectifier 15 kW**  
4 x Inv. 10.2A (4kW)

Booksize Compact  
**CU 320, SLM 16 kW**  
4 x MM 18A (9.7kW)

#### Example 2: 1 axis, 19kW



100%

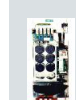
60%



Compact FSC  
**Converter 38A**

Blocksize FSD  
**PM340 38A + CU310**

#### Example 3: 1 axis, 75 kW



100%

65%



Compact FSE  
**Converter 146A**

Blocksize FSF  
**PM340 145A + CU310**

#### Example 4: 1 axis, 250 kW



100%

35%



Chassis Unit FSK  
**Converter 510A**

Chassis GX  
**PM 490A + CU310**

**Remark:** SINAMICS volume might be increased if cabinet mounted sensor modules (SMC) are used.

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## Migration Advantages NEW with SINAMICS: S120 Cabinet Modules

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

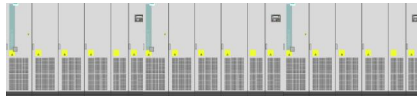
Electronics and  
Software

### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### SINAMICS S120 Cabinet Modules: A modular cabinet unit system

- Standardized Modules (Rectifiers 1Q/4Q, Inverters, System Components)
- High degree of variety regarding options and system design
- High quality and reliability due to system tested components
- Short delivery times due to standardization
- High availability
- Low variety of components
- Low variety of spare parts
- Low space requirement
- Transparent design & layout
- Application-optimized design & layout
- Service & maintenance optimized design & layout



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## Migration Advantages Wiring at SINAMICS S120 multi-axis systems

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### Significantly less Profibus cabling thanks to the central Control Unit at S120

Up to: 6 x Profibus cable and connectors  
6 x Profibus board CBP  
6 x Cabling  
Communication Programming

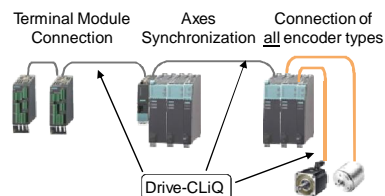


Major savings:  
• HW costs  
• Wiring

1 x Profibus cable and connector  
Profibus interface is on-board  
1 x Cabling



### Unified and easy wiring with Drive-CLiQ



All components of the drive system are connected using the same cable:

- Unified cabling (DRIVE-CLiQ)
- Reduction of components
- Pre-assembled cables
- Fast, simple plug-in-connection



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## Migration Advantages Extended Functionality at SINAMICS S120

Units for Supply  
Voltage 400V

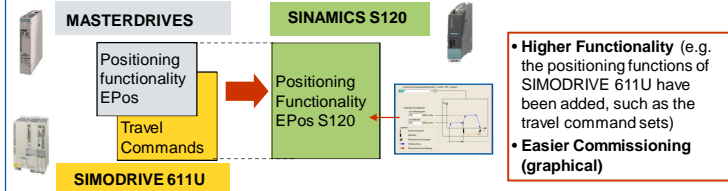
Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

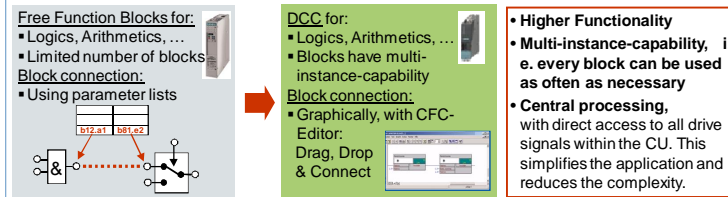
Migration  
Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### Positioning: More functionality and graphical parameter setting



### Technology: Extended functionality and graphical parameter setting



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Industry Sector MC PM BD / LD I M PM1

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## Migration Advantages Extended Functionality at S120 and Integration into SIMOTION D

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

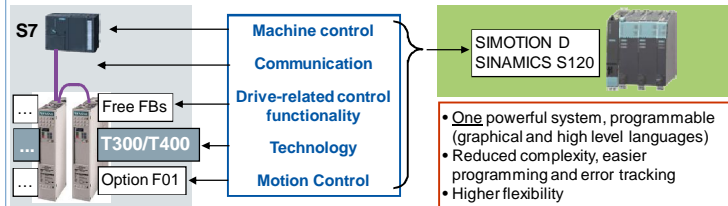
Migration  
Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### NEW with SINAMICS S120: Safety Integrated



### SINAMICS S120 integrated into SIMOTION D



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## Migration Advantages Improved Commissioning for SINAMICS G and S due to Starter Tool

Units for Supply  
Voltage 400V

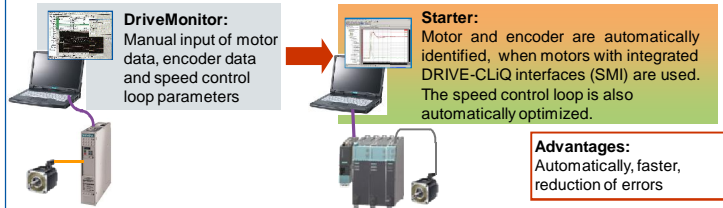
Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

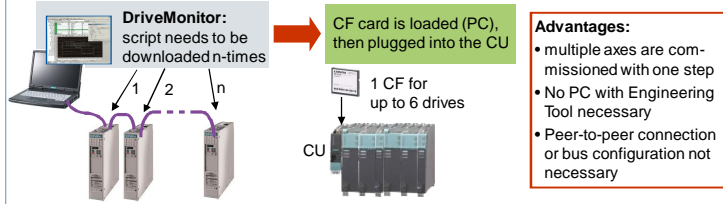
### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### Automatic Initial Commissioning using Electronic Rating Plates



### Central Memory Card simplifies the Commissioning of Serial Machines



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## Migration Advantages Reduced Downtimes

Units for Supply  
Voltage 400V

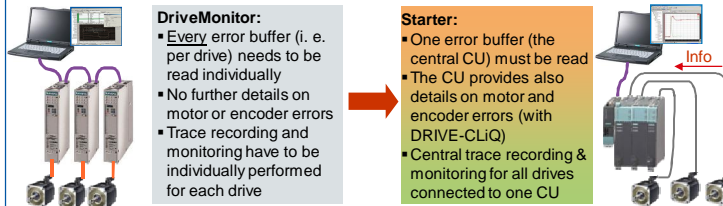
Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

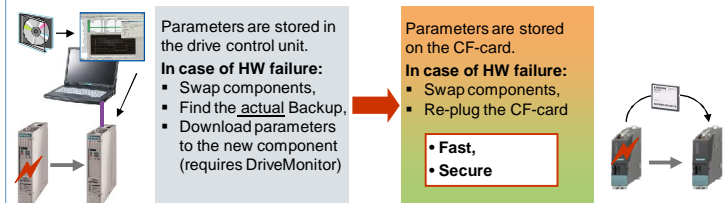
### Migration Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

### Efficient trouble shooting with central diagnostics for all components



### Faster component swapping with Memory Card



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## Migration Advantages Direct Cost Savings

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

- **Major potential savings for multi-axes-drives:**
  - One control unit for up to 6 drives
  - Only one Profibus cable for up to 6 drives, the Profibus interface is on-board
  - Double Motor Modules are available in the lower power range
- **Safety Integrated Functions replace external safety components and their wiring**
- **Rectifier / Regenerative Units no longer require an autotransformer**
- **Simplified DC-link connection up to 100 kW (Booksize)**
- **Reduced cabinet size**
- **Modular system design in formats: Booksize, Chassis, Cabinet Modules**

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## Migration Advantages Further Savings

Units for Supply  
Voltage 400V

Units for Supply  
Voltage 500V / 690V

Electronics and  
Software

Migration  
Advantages

- Overview
- HW Characteristics
- Wiring
- Functionality
- Commissioning
- Reliability
- Cost Savings

- **For the OEM:**
  - Reduced Engineering:
    - Reduction of components and complexity
    - A higher and flexible functionality simplifies the application and increases the re-usability
    - Reduced wiring
  - Shorter commissioning phase, e.g. with Electronic Rating Plates
  - Easy diagnostics and maintenance worldwide via the Internet, with no additional tools (if SINAMICS is used with SIMOTION D)
- **For the End User:**
  - Reduction of spare parts through a reduced component variety
  - Reduction of machine downtimes:
    - Efficient error tracking and diagnostics
    - Fast and secure swapping of components
    - Optimized safety concepts

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Industry Sector MC PM BD / LD I M PM1

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**Contact****Information**<http://www.siemens.com/sinamics-dcm>

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