



**NEW AC15 – AC20**

# NEW AC15 – AC20 TARGET APPLICATIONS

## AGENDA

1. Product Overview
2. Target applications
3. Q&A





# NEW AC15 – AC20 TARGET APPLICATIONS

Product Features & Benefits

# PRODUCT FEATURES & BENEFITS

## FULL SCALABLE RANGE

### AC15

- Lower cost
- 0.37 to 30kW in 5 Frames
- Open loop Induction & PMAC
- Ethernet TCPIP & STO



### AC20

- Open and Closed loop
- 1.5 to 180kW in 9 Frames
- Expandable IO, Ethernet IP and ProfiNet
- 'Anybus' fieldbus expansion modules



### AC30

- Multiple feedback options
- 1.1 to 450kW in 10 Frames
- Basic and System versions
- Highly featured modular approach



# PRODUCT FEATURES & BENEFITS

## AC15 / AC20

Variable Speed Drive - AC15  
Features

### Features

AC15 Series Drive



**Built-in Ethernet Comms**  
Modbus TCP/IP as standard.  
Access the drive webpage or program the drive through the popular and intuitive DSELite configuration tool

**Built-in RS232 Comms**  
Connect an optional remote 6901 keypad to the RJ11 port

**Built-in Motor Thermistor Input**  
PTC Motor Thermistor feedback connection as standard

#### Standards & Compliance

The product is certified to the latest international standards:  
Europe:  
- Low Voltage Directive 2006/95/EC  
- Electro-Magnetic Compatibility Directive 2004/108/EC  
- EN61800-5-1:2007  
- EN61800-3:2014+A1:2012  
- IEC 2 Compliant

North America & Canada:  
- 61800-5-1  
- CSA22.2 #14

**µSD Card Slot**  
For application cloning and firmware updates in the field

**Built-in Display Keypad**  
Operate the drive and see real time diagnostic feedback through the built-in display

**Built-in Safe Torque Off**  
Independently certified STO to SIL2, PLd as standard.  
Complies to:  
- EN ISO13849-1:2015  
- EN 61800-5-2:2017  
- EN 61508

**User I/O**  
Exceptional quantity of configurable analogue and digital I/O for maximum application flexibility

**µSD Card Slot**  
For application cloning and firmware updates in the field

**Standard Ethernet Port**  
Modbus TCP/IP, ProfNetIP & EthernetIP as standard.  
Access the drive webpage or program the drive through the popular and intuitive DSELite configuration tool

**Built-in RS232 Port**  
Connect a remote 6901 keypad to the RJ11 port

**Dedicated Motor Thermistor Input**  
PTC Motor Thermistor feedback connection as standard

**Power Cable Shielding Bracket** (not shown)  
Frames 2-5 fitted with a cable shielding and support bracket as standard

#### Standards & Compliance

The product is certified to the latest international standards:  
Europe:  
- Low Voltage Directive 2006/95/EC  
- Electro-Magnetic Compatibility Directive 2004/108/EC  
- EN61800-5-1:2007  
- EN61800-3:2014+A1:2012  
- IEC 2 Compliant

**Built-in Display Keypad**  
Operate the drive and see real time diagnostic feedback through the built-in 2-line alphanumeric display



**User fittable Option Cards**  
- Encoder Feedback card  
- GPIO card  
Both are compatible in each option slot & two identical cards can be fitted simultaneously

**Safe Torque Off**  
Independently certified STO to SIL2, PLd as standard.  
Complies to:  
- EN ISO13849-1:2015  
- EN 61800-5-2:2017  
- EN 61508

**Additional Communications Options**  
- CANopen  
- EtherCAT  
- Ethernet IP  
- Profibus DVP-1  
- ProfNet IO  
- RS485 Modbus RTU slave

North America & Canada:  
- 61800-5-1  
- CSA22.2 #14

# PRODUCT FEATURES & BENEFITS

## AC15 / AC20

### Electrical Characteristics

<b>Power Supply</b>	220 - 240 VAC $\pm$ 10 % Single Phase 220 - 240 VAC $\pm$ 10 % Three Phase 380 - 480 VAC $\pm$ 10 % Three Phase
<b>Input Frequency</b>	50/60 Hz $\pm$ 10 %
<b>Power Range</b>	1.5...180 kW Heavy Duty (HD)
<b>Overload</b>	150% for 60 sec.
<b>Output Frequency</b>	0.5...590 Hz
<b>Max. Switching Frequency</b>	12 kHz
<b>Control Modes</b>	Volts/Hertz, Sensorless Vector (SLV) or Closed-Loop Vector Mode (Induction only)
<b>Supported Motors</b>	Induction & PMAC

### Environmental Characteristics

<b>Temperature range</b>	0-40 °C (derate possible up to 45 °C)*
<b>Humidity</b>	Up to 90 % Relative Humidity, non-condensing
<b>Vibration</b>	< 0.5 g
<b>Altitude</b>	0-1000 m (derate 1% per 100m up to max. 2000m)
<b>Protection Degree</b>	IP20
<b>Pollution Degree</b>	Category 2
<b>Chemically Active Substances</b>	Compliance with EN60271-3-3: C3

\* De-rating only possible without communications option fitted

### Standards and Conformance

<b>Europe</b>	This product conforms with: - Low Voltage Directive 2006/95/EC - Electro-Magnetic Compatibility Directive 2004/108/EC - EN61800-5-1:2007 - EN61800-3:2014+A1:2012
<b>North America / Canada</b>	Complies with the requirements of: - UL508C - CSA22.2 #14 as an open-type drive
<b>STO</b>	Independently certified to: - EN ISO13849-1:2015 - EN 61800-5-2:2017 - EN 61508
<b>RoHS</b>	This product complies with the RoHS substance restrictions in accordance with EC Directive 2011/65/EU
<b>REACH</b>	This product complies with the REACH regulations EC1907/2006

# PRODUCT FEATURES & BENEFITS

## AC20

### Technical Characteristics

#### Power Ratings

220-240 VAC, Single Phase Supply Voltage				
Order Code	Input Current [A]	Output Current [A]	HD Power Rating [kW]	Frame Size
20G-12-0070-BF	14	7	1.5	2
20G-12-0100-BF	20	10	2.2	

220-240 VAC, Three Phase Supply Voltage				
Order Code	Input Current [A]	Output Current [A]	HD Power Rating [kW]	Frame Size
20G-32-0070-BF	7.8	7	1.5	2
20G-32-0100-BF	11	10	2.2	
20G-32-0170-BF	18.5	17	4	3
20G-32-0210-BF	22	21	5.5	4
20G-32-0300-BF	31	30	7.5	5
20G-32-0400-BF	41	40	11	

380-480 VAC, Three Phase Supply Voltage				
Order Code	Input Current [A]	Output Current [A]	HD Power Rating [kW]	Frame Size
20G-42-0040-BF	5	4	1.5	2
20G-42-0065-BF	7.5	6.5	2.2	
20G-42-0090-BF	11	9	4	
20G-43-0120-BF	14	12	5.5	3
20G-43-0170-BF	18.5	17	7.5	
20G-44-0230-BF	24	23	11	4
20G-44-0320-BF	36.5	32	15	
20G-45-0380-BF	44	38	18.5	
20G-45-0440-BF	51	44	22	5
20G-45-0600-BF	70	60	30	
20G-46-0750-BF	80	75	37	
20G-46-0900-BF	94	90	45	6
20G-47-1100-BF	120	110	55	
20G-47-1500-BF	160	150	75	7
20G-48-1800-BF	190	180	90	
20G-48-2200-BF	225	220	110	
20G-48-2650-BF	275	265	132	8
20G-49-3200-BF	330	320	160	
20G-410-3600-BF	370	360	180	9
				10

# PRODUCT FEATURES & BENEFITS

## AC20

### Power Connections

#### Frame 2-4

Terminal	Description
E	Earth
L1 / L	Supply Input phase L1 / Live
L2 / N	Supply Input phase L2 / Neutral
L3	Supply Input phase L3
DC+	DC+ Dynamic Brake Resistor connection (+)
DBR	Dynamic Brake Resistor connection (-)
U	U Motor Output phase U
V	V Motor Output phase V
W	W Motor Output phase W

#### Frame 5

Terminal	Description
E	Earth
L1	Supply Input phase L1
L2	Supply Input phase L2
L3	Supply Input phase L3
DC+	DC+ Dynamic Brake Resistor connection (+)
DC-	DC-
DBR	Dynamic Brake Resistor connection (-)
U	U Motor Output phase U
V	V Motor Output phase V
W	W Motor Output phase W

#### Frame 6-10

Terminal	Description
E	Earth
DC+	DC+ Dynamic Brake Resistor connection (+)
DC-	DC-
DBR	Dynamic Brake Resistor connection (-)
L1	Supply Input phase L1
L2	Supply Input phase L2
L3	Supply Input phase L3
U	U Motor Output phase U
V	V Motor Output phase V
W	W Motor Output phase W



# PRODUCT FEATURES & BENEFITS

## AC20

### Control Connections

Term.	Label	Description
X1.1	RLY1A	RelayOutput 1 (Contact A)
X1.2	RLY1B	RelayOutput 1 (Contact B)
X1.3	RLY2A	RelayOutput 2 (Contact A)
X1.4	RLY2B	RelayOutput 2 (Contact B)
X2.1	TH1	Motor Thermistor Input
X2.2	TH2	Motor Thermistor Input
X3.1	AIN1	Analogue Input 1 ( $\pm 10V$ , 0-10V, 0-20mA, 4-20mA)
X3.2	AIN2	Analogue Input 2 ( $\pm 10V$ , 0-10V, 0-20mA, 4-20mA)
X3.3	AOUT1	Analogue Output 1 (0-10V, 0-20mA)
X3.4	AOUT2	Analogue Output 2 (0-10V, 0-20mA)
X3.5	AOUT3	Analogue Output 3 ( $\pm 10V$ , 0-10V)
X3.6	0V	0V Reference for analogue & digital I/O
X4.1	0V	0V Reference for analogue & digital I/O
X4.2	24V	24V user supply
X5.1	DIO1	Digital Input / Output 1 (24V configurable)
X5.2	DIO2	Digital Input / Output 2 (24V configurable)
X5.3	DIN3	Digital Input / Output 3 (24V configurable)
X5.4	DIN4	Digital Input 4
X5.5	DIN5	Digital Input 5
X5.6	DIN6	Digital Input 6
X5.7	DIN7	Digital Input 7
X5.8	DIN8	Digital Input 8
X5.9	DIN9	Digital Input 9*
X5.1	DIN10	Digital Input 10*
X6.1	STO1	STO Input channel A
X6.2	STO0V	STO 0V reference
X6.3	STO2	STO Input channel B

\* = Frames 6-10 only



# PRODUCT FEATURES & BENEFITS

## AC20

### Option Slots

The AC20 features three option slots. All options are user installable and are ordered separately. Two option slots will accept either a speed feedback option or general-purpose IO expansion module, with a third option slot dedicated to communications option modules.



### General Purpose I/O (GPIO) Option Card

**Description:**  
The general purpose I/O (GPIO) option module offers users the opportunity to expand the drives standard I/O capability, allowing more complex motor control solutions to be implemented. The option can be fitted in either slot 1 or 2, and two options can be fitted at the same time to maximize the I/O compliment. For example, two fitted IO options will give an additional 4 analogue inputs



2004-IO-00	GPIO Option
<b>Analogue inputs</b>	2x Analogue inputs (+10V, 0-10V)
<b>Analogue output</b>	1x Analogue outputs (+10V, 0-10V)
<b>Digital I/O</b>	Digital Input/Output 1 (24V configurable)
<b>Reference voltages</b>	+/- 10V References

Terminal	Label		Description
	Slot 1	Slot 2	
X23.1	AIN3	AIN3	Analogue Input 3/5 (+10V, 0-10V)
X23.2	AIN4	AIN6	Analogue Input 4/6 (+10V, 0-10V)
X23.3	AOUT4	AOUT5	Analogue output 4/5 (+10V, 0-10V)
X25.1	DIO11	DIO12	Digital I/O 11/12 (24V configurable)
X24.1	+10V	+10V	+10V Reference voltage
X24.2	-10V	-10V	-10V Reference voltage
X24.3	0V	0V	0V Reference for analogue & digital I/O

### Encoder Feedback Card

**Description:**  
The HTTL pulse encoder feedback module allows an incremental encoder to be connected to the AC20, allowing users to take full advantage of closed-loop vector control. The option can be fitted in either slot 1 or 2, and two identical options can be fitted at the same time, allowing for simple speed following applications.



2004-EN-00	Encoder Feedback Option
<b>Maximum input frequency</b>	250 kHz per channel
<b>Input format</b>	Quadrature
<b>Output supply voltage</b>	5V, 12V, 15V, 20V

Terminal	Label		Description
	Slot 1	Slot 2	
X15.1	A	A	Channel A Input
X15.2	/A	/A	Channel /A Input
X15.3	B	B	Channel B Input
X15.4	/B	/B	Channel /B Input
X14.1	V+	V+	Encoder supply +
X14.2	V-	V-	Encoder supply -
X14.3	SCR	SCR	Cable screen

# PRODUCT FEATURES & BENEFITS

## AC20

### Communication Option Cards

The AC20 takes advantage of commonly available third-party communication modules, allowing communication over a range of popular protocols. Also included in the supported range are Ethernet IP and ProfiNet modules, for when two ports are required. Adding an Ethernet based option card is possible in addition to the onboard Modbus TCP/IP, ProfiNet or Ethernet IP port.

<b>2003-CB-00</b>	<b>CANopen communication interface</b>
<b>Supported Protocols</b>	DS301 V4.02
<b>Communication Speed</b>	10 k, 20 k, 50 k, 125 k, 250 k, 500 k, 1 Mbits/s or automatically detected
<b>Max. number of devices</b>	127
<b>Supported Messages</b>	SDO, PDO, NMT, SYNC



CANopen

<b>2003-EC-00</b>	<b>EtherCAT communication interface</b>
<b>Supported Protocols</b>	CANopen over EtherCAT (CoE) DS301 compliant
<b>Communication Speed</b>	100 Mbits/s
<b>Max. number of devices</b>	65534
<b>Supported Messages</b>	SDO, PDO, NMT, SYNC



EtherCAT

<b>2003-IP-00</b>	<b>Ethernet IP communication interface</b>
<b>Supported Protocols</b>	Ethernet IP
<b>Communication Speed</b>	10/100 Mbits/s full/half duplex
<b>Max. number of devices</b>	Virtually unlimited
<b>Supported Messages</b>	Up to 256 bytes of consumed data and 256 bytes of produced data, CIP parameter object support, Explicit messaging



Ethernet/IP

<b>2003-PB-00</b>	<b>PROFIBUS DP-V1 communication interface</b>
<b>Supported Protocols</b>	PROFIBUS-DP; Demand data and Data exchange
<b>Communication Speed</b>	Up to 12 Mbits/s; automatically detected
<b>Max. number of devices</b>	32 per segment, 126 total
<b>Supported Messages</b>	Up to 152 bytes cyclic I/O, 68 bytes class 1 and 2 acyclic data, 152 bytes configuration data. GSD file provided



PROFIBUS

<b>2003-RS-00</b>	<b>RS485 / Modbus RTU communication interface</b>
<b>Supported Protocols</b>	Modbus RTU
<b>Communication Speed</b>	1200 to 115200 bits/s
<b>Max. number of devices</b>	247
<b>Supported Messages</b>	Up to 256 bytes of cyclic I/O data in each direction



Modbus

<b>2003-PN-00</b>	<b>PROFINET I/O communication interface</b>
<b>Supported Protocols</b>	PROFINET I/O generic device
<b>Communication Speed</b>	10/100 Mbits/s full/half duplex
<b>Max. number of devices</b>	Up to 128 submodules in total
<b>Supported Messages</b>	Up to 256 bytes of cyclic I/O in data in each direction



PROFINET

# NEXT GENERATION OF PARKER AC DRIVES VALUE & BENEFITS – AC15

## Key Features:

0.37 to 30kW in 5 Frames  
230V 1 phase 0.37 to 2.2kW  
230V 3 phase 0.37 to 11kW  
400V 3 phase 0.37 to 30kW  
IP20 only



Feature	Advantage	Benefit
Ethernet Port onboard	Comms option Not required	Lower cost of ownership
STO (PLd SIL2)	No external contactor	Easy to install
Thermistor input	Dedicated function	Reduced setup time
890 / 6901 display	Clear MMI	Simple to operate
DSELite	Full configuration saved	Less maintenance time
24V Supply	Program on the bench	Less site time required

# NEXT GENERATION OF PARKER AC DRIVES VALUE & BENEFITS – AC20

## Key Features:

1.1 to 180kW in 9 Frames

230V 1 phase 2.2kW

230V 3 phase 1.1 to 11kW

400V 3 phase 1.1 to 180kW

IP20 only



Feature	Advantage	Benefit
Encoder & GPIO	Expandable functionality	Wide application range
Interchangeable Options	2 options of same type	Enhanced functionality
ProfiNet & EtherNet IP	Built in modern fieldbuses	Lower total cost
3 <sup>rd</sup> Option slot for comms	Retains 2 slots for 'I/O'	No compromises on I/O
Anybus Comms modules	Wide range of fieldbuses	Readily available cards
Removable wiring bracket	Cable shielding/support	Clean installation

\* System board option not available





**NEW AC15 – AC20**  
**TARGET APPLICATIONS**  
ATEX – Explosion-proof environment

# ATEX APPLICATIONS SENSORLESS PM MOTOR CONTROL

## Key Features:

Sensorless speed control with PM synchronous motors EY or EX ranges allowing  
- speed accuracy



Feature	Advantage	Benefit
Sensorless Control	No feedback system on motor	Less complexity & cost
Safe Torque Off (PLd SIL2)	Aligned with market requirement	Safe motor control
ATEX Cat.2 Zone 1	EX motor range available	ATEX compliance worldwide
ATEX Cat.3 Zone 2	EY motor range available	Simple to operate
DSELite	Full configuration saved	Less maintenance time

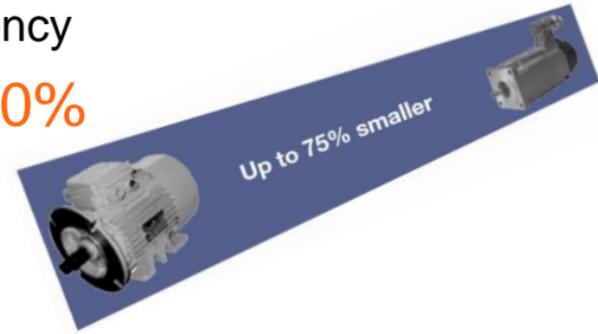
# AC15 – AC20 TARGET APPLICATIONS EX & EY RANGE OVERVIEW

	EY	EX
<b>Power</b>	460W to 6.8kW	400W to 3.9kW
<b>Torque</b>	2 to 41Nm	1.75 to 35Nm
<b>Feedback</b>	sensorless	sensorless
<b>Protection class</b>	IP65	IP64 and IP65 as an option
<b>ATEX protection</b>	"nA" non sparking/arcing for gas "tc" by enclosure for dust	"d" explosion proof for gas or dust
<b>Marking</b>	CE and IECEx <b>Zone 2, category 3</b> , gas IIC, temp.T3 (200°C)	CE and IECEx <b>zone 1, category 2</b> , gas IIB, temp.T4 (135°C) UL class 1, Division 1, gas group C&D, temp T4A (120°C)
	  	  

EX and EY servomotors have the same active parts :  
Brushless with 10 poles permanent magnets for high dynamics and low inertia

# NEW AC15 – AC20 TARGET APPLICATIONS EX & EY BENEFITS

- Energy saving due to very High Efficiency
  - **Efficiency of more than 90%**
  - Between 65% & 85% for standard induction motors
- Compact solution
  - High torque density
  - More than 2 times more compact face to standard induction motor
- Less thermal dissipation at low speed than AC motor
- No additional forced fan

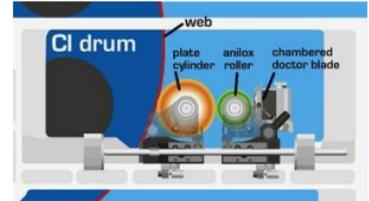


# ATEX APPLICATIONS OTHER APPLICATIONS

- Dosing, mixing of powder, granulate chemical
- Printing: ink roll
- Vacuum Pump



Mixing of  
pharmaceutical powder



Printing : Ink Roll



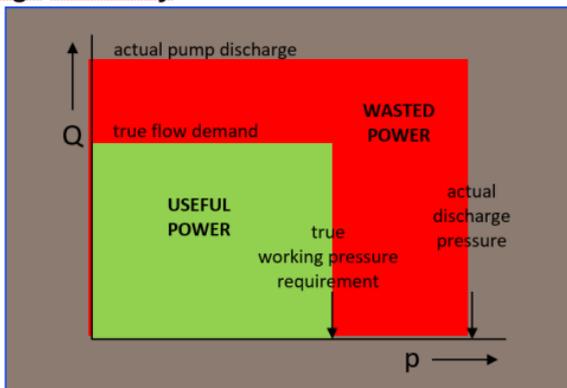
# NEW AC15 – AC20 TARGET APPLICATIONS

Energy Saving

# ENERGY SAVINGS APPLICATION HYDRAULIC SYSTEM

## Hydraulic system without motor speed control

### Average efficiency

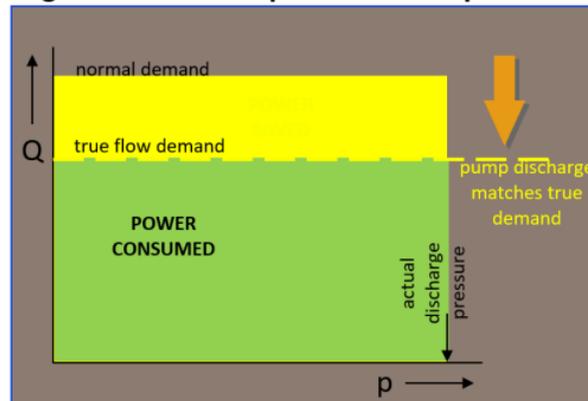


*Prime cause of losses is mismatch of power supplied to true demand*



## Hydraulic system with motor speed control

### Speed regulation reduces power consumption



*Pumping just the right volume of oil has a proportionate reduction in energy costs*

- Reducing the motor speed during low demand times can achieve significant energy savings.
- By automatically adapting the pump's speed to changes in demand, AC15 is the perfect solution
- Retrofitting of existing hydraulic systems

# ENERGY SAVINGS APPLICATION HYDRAULIC SYSTEM

Upgrading a shear press with PARKER AC drive



# ENERGY SAVINGS APPLICATION HYDRAULIC SYSTEM

## Upgrading a shear press with PARKER AC drives



Previously :2x Motors 75KW  
50Hz (1500 RPM)connected  
with a PV pump and a  
constant pump

Proposal: 2x AC20 55KW to  
reach maximum speed  
73Hz(2190RPM) , in order to  
use smaller pumps



Speed will reach minimum  
speed of the pump when  
machine is not in operating  
mode (could be 50% of the  
time)

# ENERGY SAVINGS APPLICATION HYDRAULIC SYSTEM

Upgrading a shear press with PARKER AC drives



Static Shear



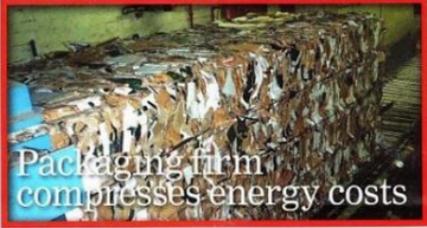
Static Baler

# ENERGY SAVINGS APPLICATION HYDRAULIC SYSTEM

## Competitor Activity

ENERGY SAVING AWARD

SPONSORED BY **ABB Drives&Controls**



**Packaging firm compresses energy costs**

A manufacturer of cardboard packaging has cut its annual electricity bill by nearly £2,800 a year by installing a variable-speed drive on an hydraulically-powered baling machine. The machine is also quieter now and its motor runs cooler.

At its plant in Northampton, Smurfit Kappa manufactures packaging products such as fruit and vegetable trays, fresh produce boxes, and retail-ready packaging. It uses an hydraulic baler to compact offcuts from its cardboard processing lines into large bales, ready for transport to a recycling plant.

The company wanted to improve the energy efficiency of the baling machine, which uses a motor-driven pump to compress the hydraulic fluid. Originally, this motor ran at a fixed speed. When the hydraulic pressure reached a set point, excess fluid was diverted through a pressure relief valve. This excess fluid represented wasted energy that was not producing any useful work.

Another problem was the high temperatures generated by the constant use of the baler. Leaving the hydraulic motor on full demand meant that Smurfit Kappa had to install an additional motor-driven fan to keep it cool.

Chris Sims, the company's energy and environmental officer, asked Derbyshire-based Inverter Drive Systems (IDS) to look at the energy-saving potential of the application. "IDS had already installed or modified some motors on other applications," he explains, "so I invited them to look for more energy-saving opportunities."

Smurfit Kappa and IDS monitored the baler's energy use. They found that the machine's power consumption was 11.1kW and that it was running for 6,336 hours in a year. At an energy cost of 8p/kWh, this gave a total annual running cost for the baler of £5,626.

IDS installed a general-purpose 30kW drive as well as a pressure transducer. "The pressure transducer gives a 4–20mA output that is proportional to the pressure," explains Andy Crocker of IDS. "On the drive, we have the set point at just below the valve opening pressure. When the hydraulic ram is moving and fluid is therefore flowing, pressure drops, so the drive speeds up the motor to maintain pressure. When the ram is not moving, pressure rises so the drive slows the motor."

This arrangement means the drive can always give the pressure and flow needed without opening the relief valve and wasting the pressure in the fluid.

Following the installation of the ABB variable-speed drive, which took less than a day to complete, the power consumption was measured again and found to be 5.6kW. Over the course of a year, this would result in an energy cost of £2,838 – a saving of £2,788 on the previous arrangement, with a payback time for the installation of just over 17 months.

"As well as the energy-saving aspect, there has also been a reduction in noise from the application and the motor now also operates at a lower temperature," Sims reports. "IDS were also very professional in their installation procedures and worked around our production times to minimise disruption."

# HYBRID SOLUTION 2

- Replacing an induction motor by a Permanent Magnet AC motor, a way to :
  - Improve the efficiency
  - Control cylinder speed & position by driving the hydraulic pump precisely



NX4



650S



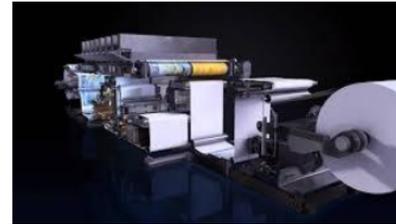
A photograph of a wind farm at sunset. The sky is a mix of orange, yellow, and dark clouds. Several wind turbines are visible, their silhouettes against the bright sky. In the foreground, there is a field of tall, golden-brown grasses. The overall mood is serene and natural.

# NEW AC15 – AC20 TARGET APPLICATIONS

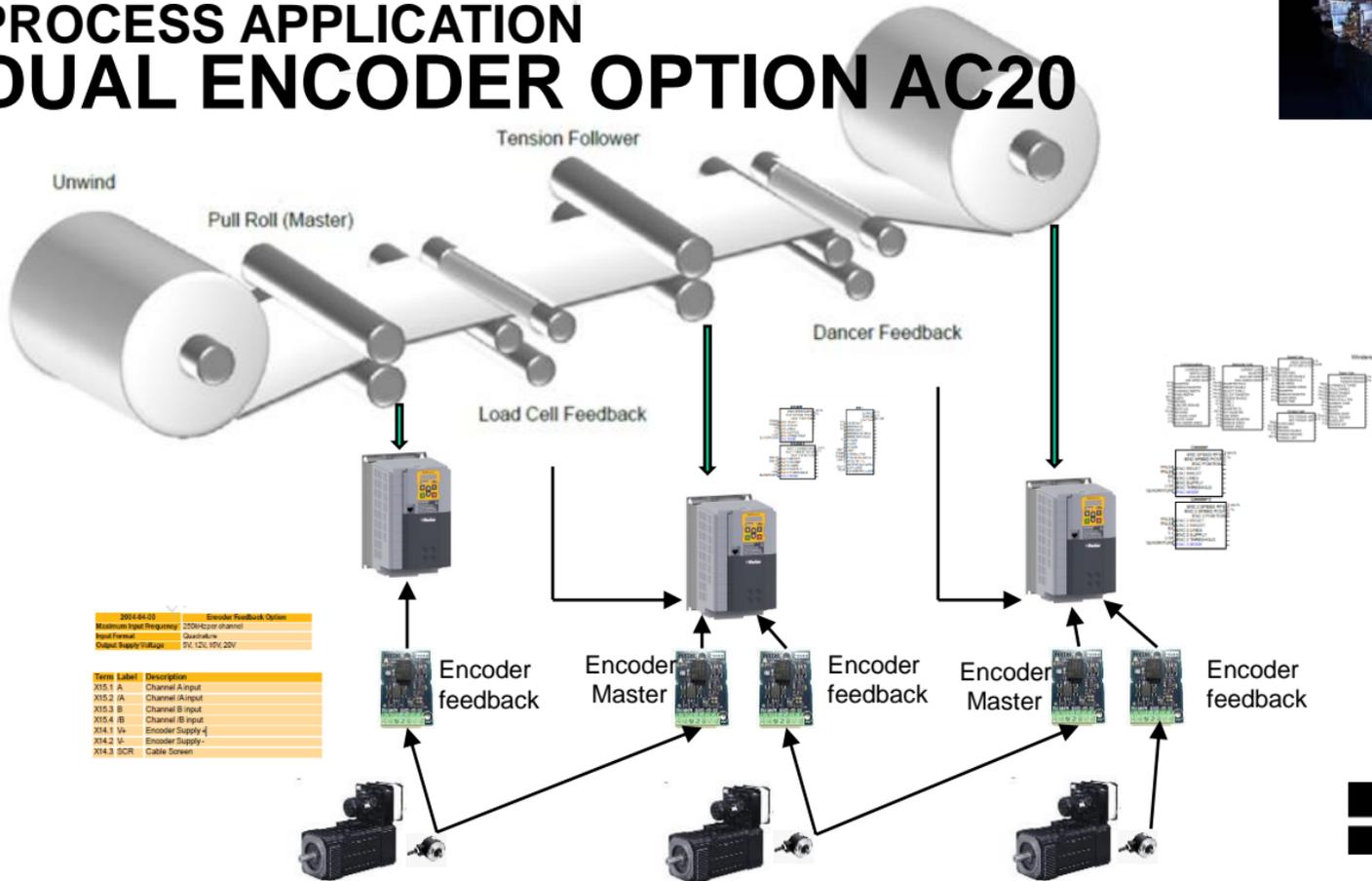
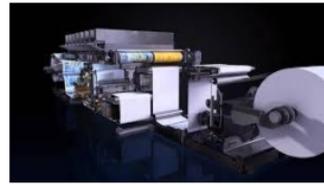
Process Applications

# PROCESS APPLICATION EXAMPLES

- Converting (coating line ..)
- Extrusion
- Metal
- Wire and Cable 
- Paper machine (calander, winder/Unwinder...)



# PROCESS APPLICATION DUAL ENCODER OPTION AC20





**NEW AC15 – AC20**  
**TARGET APPLICATIONS**  
Opportunities for Distributors



# Q&A