

**PLARAD**<sup>®</sup>  
Torque & Tension Systems

# Bolting Systems & Services for **Windpower**





# Competence through experience

We have 50 years experience in bolting technology.

We can advise you with competence and supply efficient solutions for all bolted joints in wind turbine installations.

- Foundation
- Tower joint
- Baseplate
- Machine housing
- Azimuth
- Generator
- Coupling
- Brake
- Gearbox
- Bearing support
- Hub
- Drive shaft
- Pitch bearings
- Rotor blade



## Customer base

Through our intensive collaboration with manufacturers, erection teams and service companies all over the world, we know the requirements for the production, assembly and maintenance of wind turbines.

### Manufacturers/ OEM's

- Production, fabrication
- Erection
- Service

### Independent wind turbine installation contractors

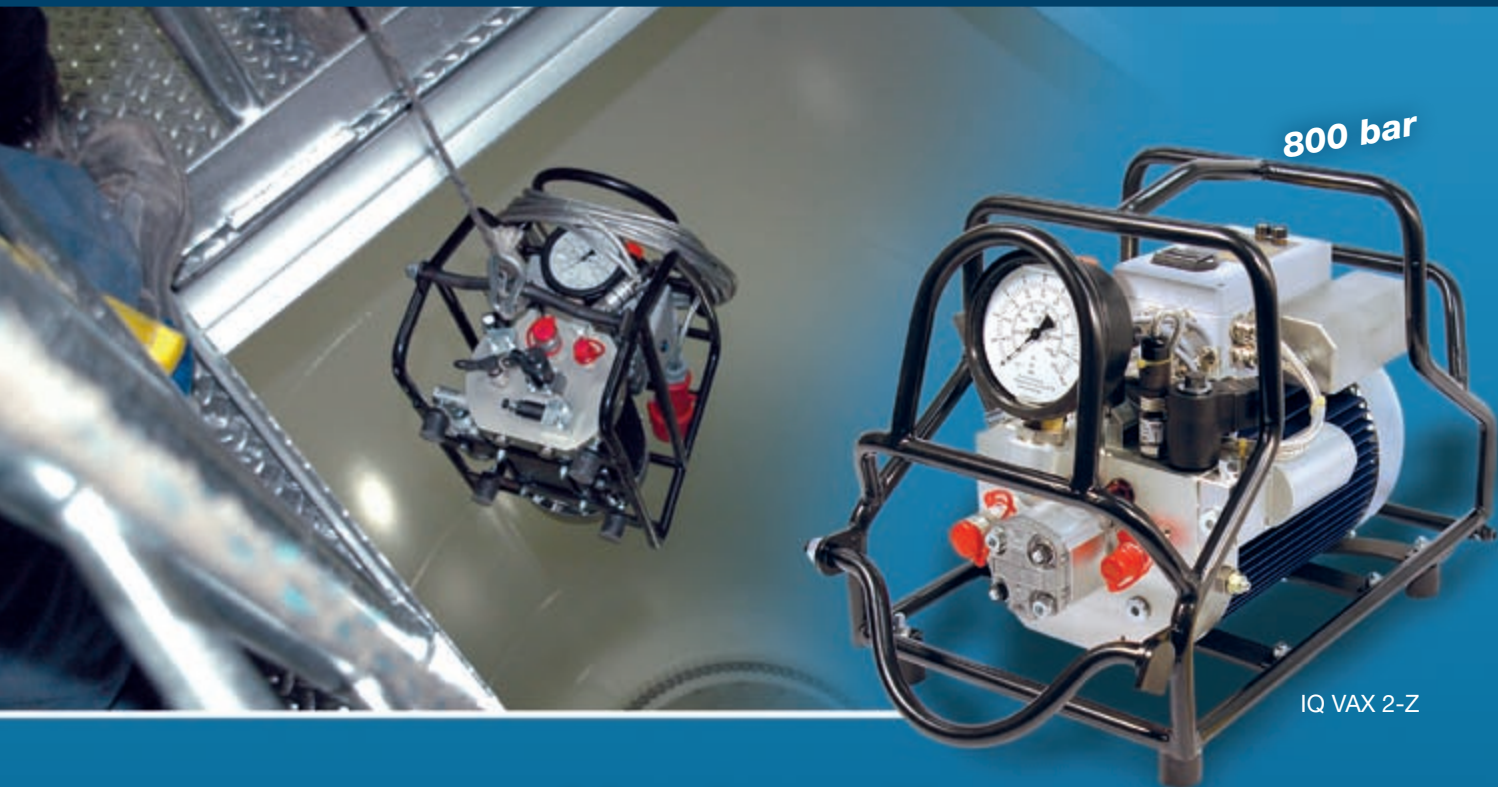
- Erection

### Independent service contractors

- Service

### Operators (Energy companies)

- Service



IQ VAX 2-Z

# Hydraulic Power Packs

Our robust and durable power packs are 100 per cent optimised for the demands of windpower and have proven themselves in hard continuous use – from the compact XB power packs to the fully automatic VAX power packs, the IQ power packs with documentation and the Dual Power unit which supplies both 800 and 2,100 bar.

The units are powered with an oil immersed motor. This design principle provides optimal power to weight ratio. Together with the high-speed cooling system, (oil and fan) it also prevents overheating.



The lightweight and extremely compact XB 1 power pack is ideally suited for service and maintenance.

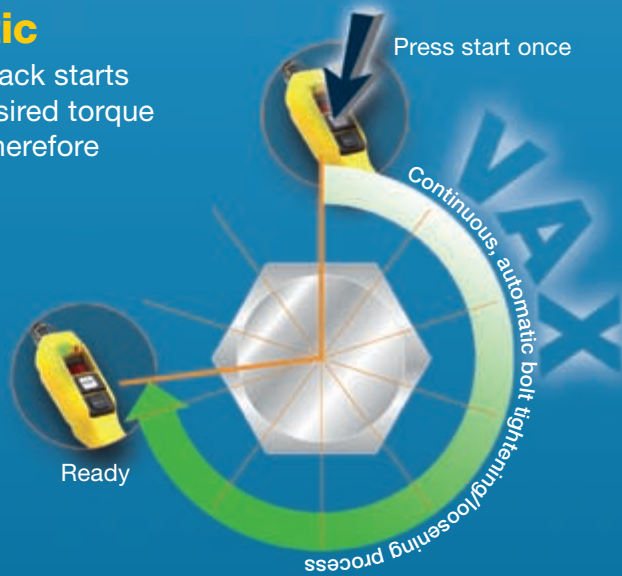


XB 1

## VAX – unique and fully automatic

With just one press of a button, the VAX power pack starts the fully automatic bolting process. When the desired torque is attained, the unit switches off automatically. Therefore operator errors are eliminated.

Operator can observe the tightening process without needing to continually re-adjust.



## iQ – Documentation & Multi-Bolting Procedure

With the IQ power packs, previously defined bolting methods can be easily loaded from the control unit – whether torque or torque angle technique. The resultant data of each bolt tightened/torque angle is stored in the control unit. The results can later be loaded on to a PC and archived for documentation purposes.



Operation of the power pack takes place by means of a user-friendly remote control unit. The remote control unit for the IQ power packs has a display indicating the parameters voltage, current, temperature, pressure, torque and rotation angle (in the case of rotation angle technique).



## Dual-Power – one power pack, two pressure settings



The IQ Dual-Power Unit is capable of powering both hydraulic wrenches with 800 bar and tensioning cylinders with up to 2,100 bar.

IQ VAX 2-Z D 2100



# Classic tightening wrench MX-EC/MSX

Thanks to their speed, ergonomic design and safety, the MX-EC and MSX set new standards in almost every bolting situation.

The reaction arm can be quickly and easily mounted anywhere around 360°



The quick release system allows easy and quick exchange of insert drive attachments (square or special)



MX-EC 200, Bespoke design for M 64 bolts – specially developed for windpower



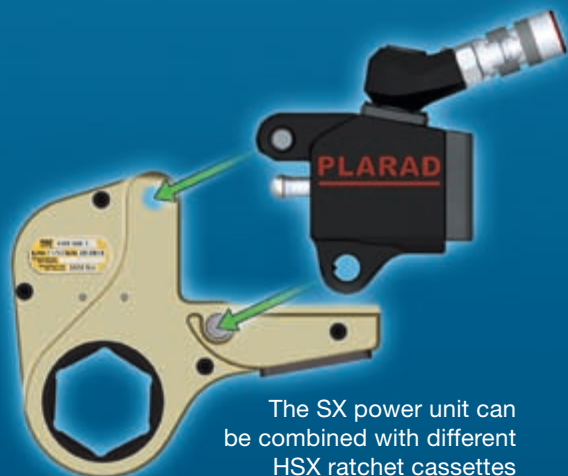
360° rotating hose connection, optionally swivelling

100 to 45,000 Nm

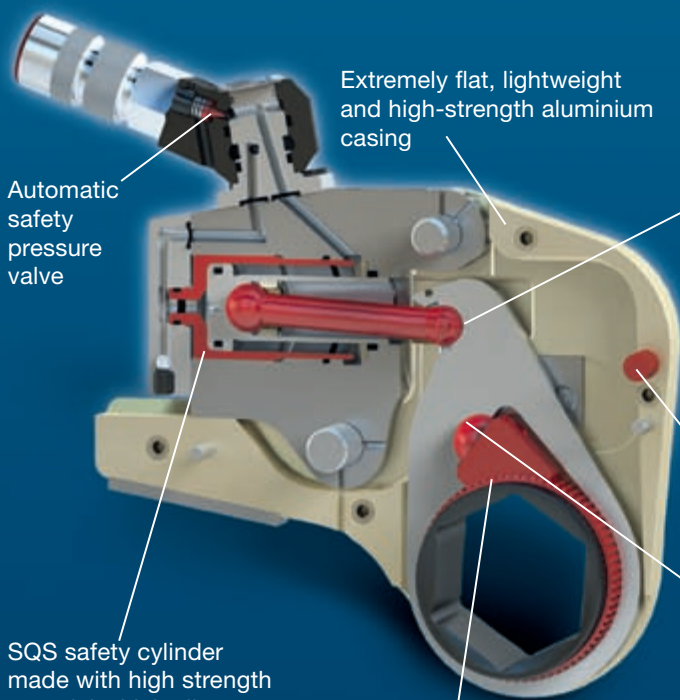


# Cassette Wrench FSX

Thanks to its slimline design, the FSX can be used in confined and inaccessible spaces.



The SX power unit can be combined with different HSX ratchet cassettes as required



Extremely flat, lightweight and high-strength aluminium casing

Automatic safety pressure valve

The spherical connection between lever and ratchet ensures optimum transfer of the torque generated

Integral sudden release impact absorber protects the casing from damage should a sudden release occur

Spherical bearing lever-piston system – if sudden release shock occurs, the piston separates from the lever and reconnects automatically. There is no connection to be broken

SQS safety cylinder made with high strength material which allows high pressures in a lightweight casing eliminating the risk of casing rupture

Durable, fine-gear ratchet system. A full stroke is not essential



Adjustable handgrip supplied with MX-EC/MSX and FSX

# Hydraulic Bolt Tensioners

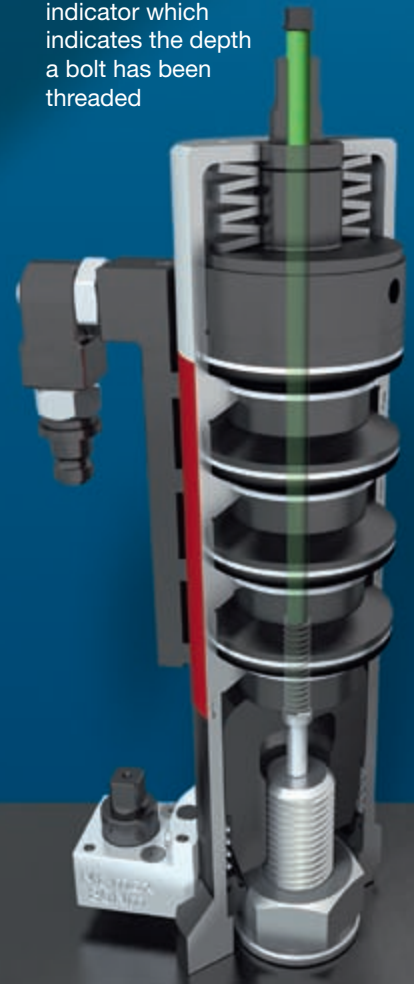
The tightening of bolts with hydraulic bolt tensioners allows bolted joints without torsion or bending loads. The pretensioning force can be set precisely.



After the hydraulic tensioning, the nut is turned with a ratchet wrench and a rotating sleeve until it is fully seated.



Operating errors are avoided via the green safety indicator which indicates the depth a bolt has been threaded





DE – conceived for continuous use in installation, maintenance and production.



100 to 12,000 Nm

## Nutrunner DEA / DEM

The electrically powered nutrunner is available in two versions: DEM with manual and DEA with automatic 2-speed gearbox.

These nutrunners are characterised by their easy safe handling and low-noise vibration-free technology.



The angle drive enables work to be conducted in otherwise inaccessible places.

## Torque Multiplier XVR / XVK

The hand-operated torque multipliers from Plarad are ideal for jobs where there is no external power source – effective for releasing and tightening of bolts, anywhere and at any time.

200 to 10,000 Nm



Flexible, thanks to the height-adjustable support

XVR – proven technology used in the installation and maintenance of tubular grid masts





Measurement of torque and tightening angle

Measurement Transducer KBW for Torque Wrenches



## Setting, measurement, control

With Plarad measurement technology, you can test your tools, measure torque values directly while bolting and have precise control of the bolting process. Here, the microprocessor-controlled device GMV 2 is the central test and control unit.



GMV 2



Measurement Transducer KBW mounted on the DEMW (90° angle drive)

Measurement of Torque



Measurement transducer for hydraulic wrenches

The measured values are saved with the date and time and can be printed out directly from the unit or transferred to a PC for further analysis.



Microsoft Excel - DrehMOM.xls

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Verschraubungs-Nr	Datum	Zeit	Schraubfall	Medium	SoSt-Nm	Min-Nm	Max-Nm	SoSt <sup>1</sup>	Ergebnis	ist-Nm
33	17.05.2006	10:42:28	SHS V140	M <sup>+</sup>	450	1000	2000	40	Schraube fest	318
34	17.05.2006	10:44:13	SHS V140	M <sup>+</sup>	450	1000	2000	40	OK	1276
35	17.05.2006	10:46:10	SHS V140	M <sup>+</sup>	450	1000	2000	40	OK	1244
36	17.05.2006	10:49:30	SHS M	M	2000	1800	2200	0	Schraube lose	1709
37	17.05.2006	10:49:37	SHS M	M	2000	1800	2200	0	Schraube lose	1424
38	17.05.2006	11:03:43	MBSK M	M	1600	1400	1800	120	Schraube lose	1654
39	17.05.2006	11:03:57	MBSK M	M	1600	1400	1800	120	Schraube lose	778
40	17.05.2006	11:04:47	MBSK M	M	1600	1400	1800	120	Schraube lose	1658
41	17.05.2006	11:04:57	SHS M	M	2000	2000	2000	120	OK	2491
42	17.05.2006	12:08:28	SHS M	M	2000	2000	2000	120	OK	2478
43	17.05.2006	13:42:23	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1657
44	17.05.2006	16:07:43	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1617
46	17.05.2006	16:23:34	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1689
46	17.05.2006	16:24:06	SHS V 40	M <sup>+</sup>	750	700	2000	40	Max M	2526
47	18.05.2006	16:15:25	SHS V 40	M <sup>+</sup>	750	700	2000	40	Schraube fest	1692
48	18.05.2006	16:17:53	SHS V 40	M <sup>+</sup>	750	700	2000	40	Schraube lose	1642
49	18.05.2006	16:20:04	SHS V 40	M <sup>+</sup>	750	700	2000	40	Max M	2526
50	18.05.2006	11:34:41	SHS V 40	M <sup>+</sup>	750	700	2000	40	Max M	2511
51	18.05.2006	11:27:05	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1626
52	18.05.2006	11:08:36	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1607
53	18.05.2006	12:08:52	SHS V 40	M <sup>+</sup>	750	700	2000	40	Max M	2529
54	18.05.2006	12:09:40	SHS V 40	M <sup>+</sup>	750	700	2000	40	OK	1657

## Testing of Bolting Tools

For the testing and presetting of bolting tools, the GMV 2 system and the corresponding testing device is the ideal combination.



Test device PH for the testing of electric and pneumatic torque wrenches/ hydraulic wrenches.



Reaction torque transducer DRT for the testing of torque wrenches, electrical and pneumatic torque wrenches and impact tools of various types.



## Internal Company Seminars

We hold continuous internal training courses to increase the specialist knowledge of our employees

# Competence Centre Windpower

**PSA** Sicherheitstechnik GmbH & Co. KG



## On-Site Support

Our Competence Teams are directly equipped with safety gear from PSA Sicherheitstechnik GmbH. They also participate in special safety training courses so that they can support you directly at your side on-site.



## Bolting Case Analysis

We can provide detailed analysis of your bolting application using 3D CAD simulation effectively tailoring an efficient individual solution.



We are happy to accompany you through the design process, assisting you to deliver the most economical solution.

## Training

We train your employees in the basic fundamental elements of bolting technology in seminars.

We also provide training for your employees with regard to the safety aspects, application, use - maintenance and setting of our tools.



After delivery and before use our external field staff will brief you on the operation of your Plarad products

## Complete Container Kit

In co-operation with tools specialists such as Würth GmbH & Co, we provide a completely equipped tool container.

This minimises your logistics costs.



# Offshore Competence

Plarad has for many years had customers in the field of offshore oil production and has been able to gain experience in this difficult working environment. You can benefit from this in the field of offshore windpower.

With their experience and know-how, also in relation to safety, Plarad employees can meet the most difficult working demands.

Our employees are prepared and trained for offshore assignments – here training simulation of a helicopter crash.



The tools are also salt spray tested.

The demands on material, tools and workers in the offshore world are extreme – the materials in our tools are designed correspondingly.

We co-operate in our product development with professional and research institutes (such as the IWM, Fraunhofer Institute for Materials Mechanics). We also have our tools tested by external testing institutes in order to guarantee product quality.

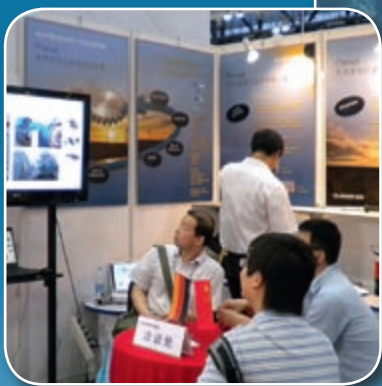
“BARD Offshore 1” is an offshore windfarm from BARD Engineering GmbH under construction about 100 km off Borkum. At the beginning of December 2010, power from the first erected wind turbines of what is currently the biggest offshore windfarm in Germany was fed into the grid for the first time.



## Erection Support

Both in the pre-assembly of the wind turbines and in their installation offshore, Plarad, is in close co-operation with BARD-Building, supporting the construction of “BARD Offshore 1”





**Visit us at national  
and international trade fairs.**



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