



Screwdriving Technology

Automation

Air Motors

Air Tools

DEPRAG
machines unlimited



SMART FACTORY - INDUSTRY 4.0
Intelligent Tools

Air-Operated Angle Grinders DIQ

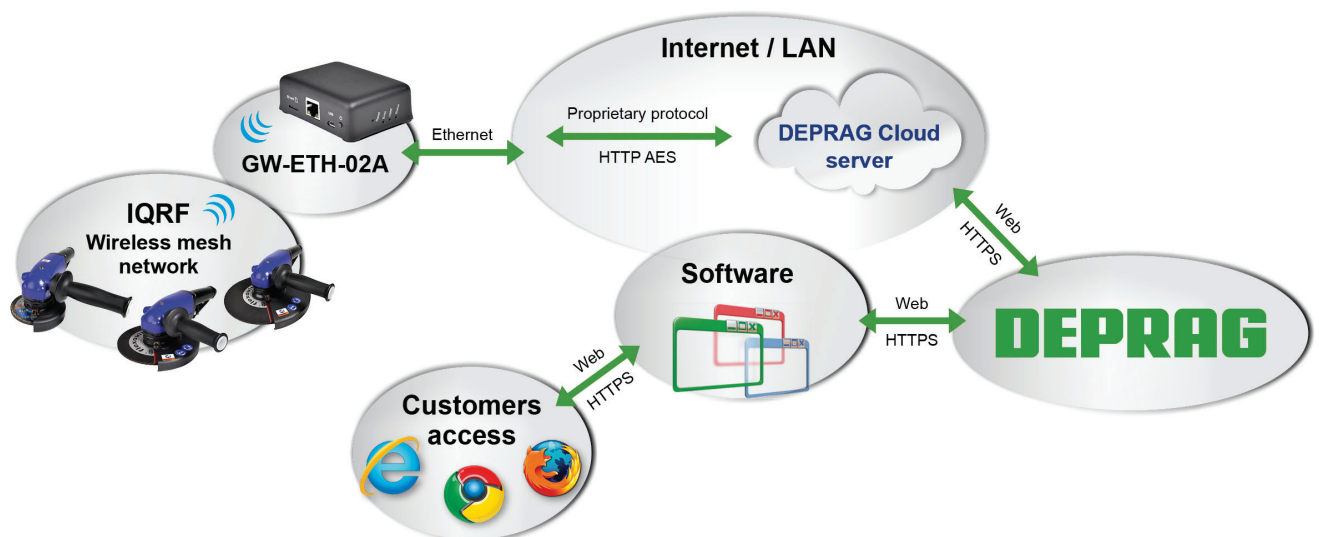
- Access to technical documentation
- The tool and the operating process is continuously supervised
- Optimal use of the tool to achieve maximum effectiveness
- Possibility to obtain recommendations for best-suitable tool fitting any given application
- Compare different tools and/or operators
- Access data about air-consumption for improved production planning
- Optimization and effectiveness recommendation (for example grinding speed, tool load)
- Exact control of the service intervals; overview of individual repair expenditures
- Uptime of the tool
- Energy-saving = cost-saving

The developments of the 4th Industrial Revolution, **Industry 4.0 / Smart Factory**, now also applies to some of the **DEPRAG INDUSTRIAL air-grinders**. Those grinders are equipped with the revolutionary DIQ-technology that allows to continuously evaluate the current **operating conditions of the tool!**

All data are acquired during the actual work flow; **it is continuously evaluated and stored on the web.**

By utilizing a special IQRF Network - it operates in the frequency range of 868 MHz - the acquired data is made available via wireless output. The transfer takes place by a **Gateway** into the **LAN/Internet** and the data is stored in the **DEPRAG Cloud**.

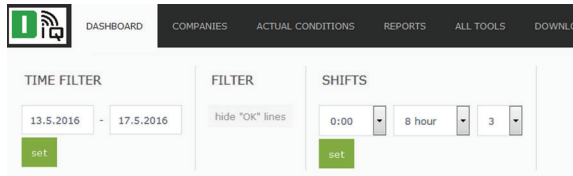
The principle of the data transfer, including communication:



Industry 4.0 - Smart Factory - Air Grinders DIQ - Application

The intelligence embedded in the grinder does not require any external energy supply. It also works autonomously. Data is collected and transferred. The intuitive user interface guarantees easy data access.

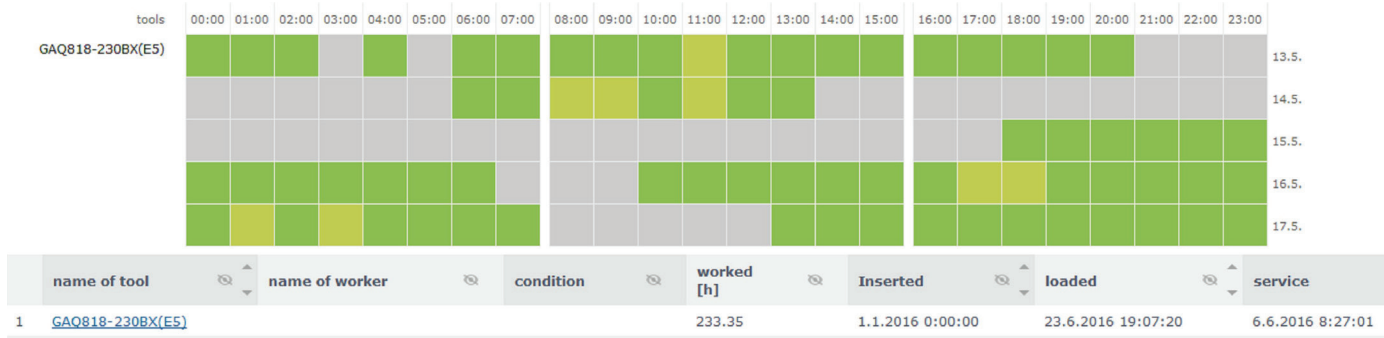
Dashboard - for quick overview of all tools



The results displayed on the dashboard are based on the traffic light principle:

- Green – „okay“,
- Orange – „a small problem has occurred“
- Red – „a serious problem has occurred.“

This helps you to see at a glance whether all tools are ready to operate.



Detection of DIQ Tools

The application detects all DIQ tools, allows registration of employees and tracking of each employee's tool use and the branched company structure. Each tool can be traced back to the person that was using it. The usage details of each tool is recorded. The application includes easy access to all technical documentation for each registered tool, including operating instructions, safety regulations and much more.

	Id	name	surname	telephone	subordinates	classification	responsibility
1	56	George	Archer		workers	departments	tools
2	58	Henry	Shane		workers	departments	tools
3	59	William	Stephens		workers	departments	tools
4	60	Jack	Upton		workers	departments	tools
5	61	Daniel	Wolfwood		workers	departments	tools
6	65	Jordan	Keane		workers	departments	tools
7	66	Luke	Forster		workers	departments	tools
8	67	Tom	Higgins		workers	departments	tools
9	68	Matthew	Lancaster		workers	departments	tools
10	69	Adam	McKenzie		workers	departments	tools
11	70	Thomas	Maxwell		workers	departments	tools

Registration Card for the DIQ Tool

For each tool a separate registration card is generated. The following data – for example – are saved:

- Technical parameters (e.g. power, speed, weight)
- Serial number
- Initial day of operation, date of last service
- Total runtime of the tool
- Overview of all tool users
- Complete overview of all services (date, repair costs)

WORKED		WORKERS - HISTORY		SERVICE COSTS - HISTORY		BASIC PARAMETERS		OTHER PARAMETERS	
parameter	value	worker	date	type of service	price (€ 44 €)	parameter	value	parameter	value
hours worked, total	233.35 hour	Richard	31.12.2016	Grease	19 €	name	GAQ818-230BX(E5)	classification	
hours worked, load	233.35 hour	Show more		Gearbox seal check	25 €	type	GAQ818-230BX	date of introduction into production	1.1.2016
total air consumption	26705.53 m³			Show more		serial number	16/70122250	last service date	6.6.2016
						weight	4.40 kg	last readout date	14.8.2016
						speed	8000.00 rpm	end of warranty	0.0.0000
						diameter of grinding wheel	180.00 mm	service - total costs	44 €
						air consumption	2.50 m³/min		
						power	2300.00 W		

Industry 4.0 - Smart Factory - Air Grinders DIQ - Application

The application is equipped with an information panel which displays the **current status of the tools**:

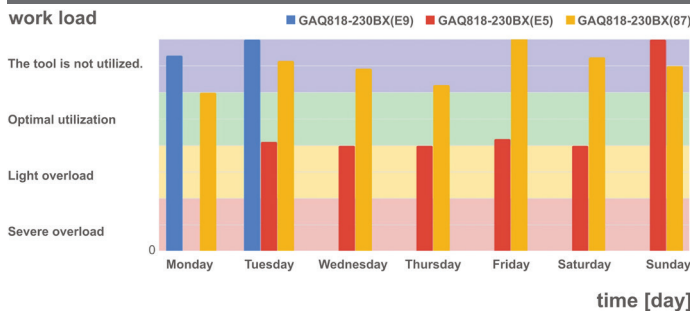
- Online status according to tool type
- Assigned user
- Current tool status - OK, malfunction or similar, including information on hours of operation

tools	name of worker	condition	supervisor	company	worked [h]	Inserted	loaded	service
1 GAQ818-230BX(E9)	John Taylor	OK		Kasi	50.49	1.1.2016 0:00:00	17.6.2016 6:13:40	19.5.2016 9:10:19
2 GAQ818-230BX(E5)	Richard Hunt	OK		Kasi	233.35	1.1.2016 0:00:00	14.8.2032 15:33:56	6.6.2016 8:27:01
3 GAQ818-230BX(87)		OK		Kasi	612	1.1.2016 0:00:00	30.3.2016 0:00:00	21.6.2016 9:46:21

The Card “Current Status“: Last display indication, including the most recent executed service. An alert will be displayed when maintenance is required.

Visualization of analyzed data

One of the main functions and advantages of the application is the visualization of the analyzed data. The working effectiveness of each tool can be displayed. The actual grinding speed is measured and compared with the optimum grinding speed. Furthermore, the average-, total and hourly air-consumption is displayed. The application tracks temperatures and the battery level.



The intelligent system continuously measures the registered tool and evaluates the tool in four level diagram:

- the tool is not utilized (the tool is unnecessarily too powerful for it's application)
- optimal utilization (recommended loading)
- light overload (not recommended loading)
- severe overload (usage prohibited - leads to significant shortening of the tool's lifespan)

FAST FILTERS

subject: effectivity, optimal speed, air consumption - total, air consumption - average, work load, worked time, battery status

group by: tools, worker

time span: day, week, month, year. Current week: 2017

choice of tool: GAQ818-230BX(E9), GAQ818-230BX(E5), GAQ818-230BX(87). cancel choose

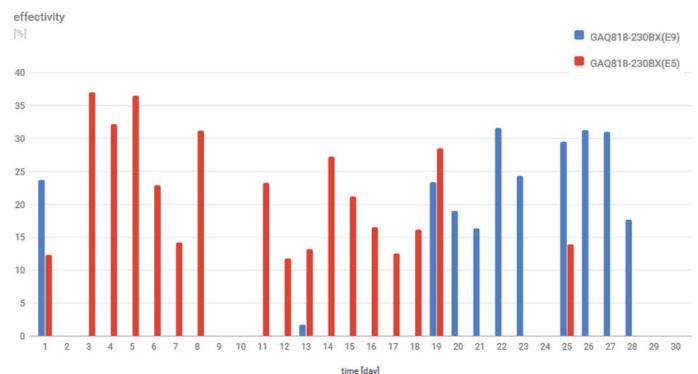
erase filter and activate

If necessary, various tools can be compared with each other - as well as employees' performance. All data is displayed in a timeline: from single hours up to several months.

Those responsible for the optimization of the production process have access to the following information:

- Current status of the tool (OK / NOT-OK)
- Assignment of the tool to a specific employee, under the selected organizational structure for the respective manufacturing process in the company.
- Online access to technical documentaton, safety rules and parameters of a particular tool type.
- Time sequence of repairs of specific tool, incl. associated expenses.
- Operating time of the tool.
- Observance of the maintenance services.
- Reports and recommendations for attaining optimal efficiency.
- Comparison between different tools and individual employees.

Displaying working efficiency of the grinder
Comparison of two grinders of the type GAQ 818-230BX (April 2016)



Reports can be saved in XLS- Format, PDF or as a CSV document and can be used for further processing.



Thanks to the DIQ-technology, important and clear operational information is obtained, which is necessary for the optimization of the production process and the increase of its effectiveness. Lowering production-cost is crucial in this day and age, not only for the price of a product, but also for the profitability of a manufacturer.

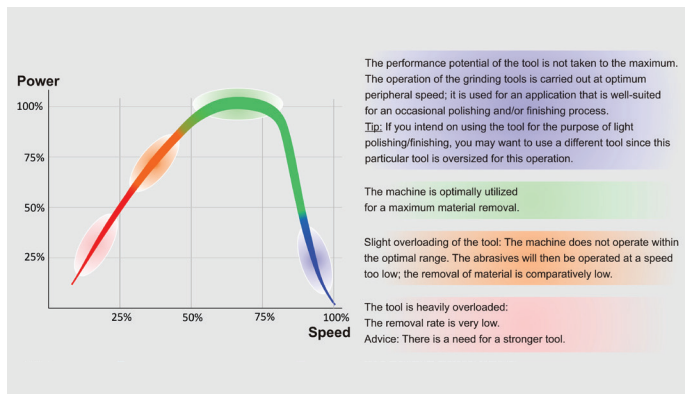
Characteristics of the pneumatic tool with speed regulator

Power

In order to use the grinder optimally, the tools should be operated with maximum power. To run pneumatic tools effectively, the power range should be between 40% and 100%.

Air consumption and speed

DEPRAG grinders are equipped with a responsive speed regulator, with which the speed is kept almost constant even under differing loads. The speed regulator allows the adjustment of the peripheral speed, so that the maximum potential of pneumatic tools can be utilized for any given application. At the controlled idling, the air consumption is extremely low.



ACCESSORIES

Software packages for DIQ application	License	Part No.
BASIC - access to basic data for air tools and operating hours	monthly	6078981
	annual	6078983
MASTER - full access incl. graphical analysis of all parameter pertaining to the operational efficiency	monthly	6078982
	annual	6078984
Access Areas	SW 1 „Basic“	SW 2 „Master“
Acquire all company owned DIQ-tools	X	X
Develop Company Structure	X	X
Assign tools to company structure (tools are assigned to their fabrication area)	X	X
Operating Hours of the DIQ-tool	X	X
Combined cost for repairs	X	X
Tool chart	X	X
Access to online documentation	X	X
Tracking of periodic maintenance intervals	X	X
Current status (On-line, Off-line, Errors, Maintenance)	X	X
Dashboard		X
Grinding Efficiency		X
Optimum grinding speed		X
Grinder workload (4 step - evaluation)		X
Air-consumption - average		X
Air-consumption - total		X
Actual working hours (timer)		X
Compare individual tools		X
Compare the different fabrication areas		X
Battery status		X

IQRF Gateway	Part Number
Device GW-ETH-02A (72D)	6080094
Device GW-ETH-02A (72D) incl. protective cover IP54	6022835A
Device GW-WIFI-01 (72D)	6080306
Device GW-WIFI-01 (72D) incl. protective cover IP54	6023053A
Device GAW-GSM-02A (72D)	6080379
Device GW-GSM-02A (72D) incl. protective cover IP54	6023082A
Device GW-ETH-02A (72D) IP54 (without GW)	6022802

For the data transfer from the grinder into the CLOUD storage, it is necessary to establish an IQRF network connection.

GW-ETH-02A (72D)
(obj.č. 6080094)



GW-WIFI-01(72D)
(obj.č. 6080306)



GW-GSM-02A(72D)
(obj.č. 6080379)



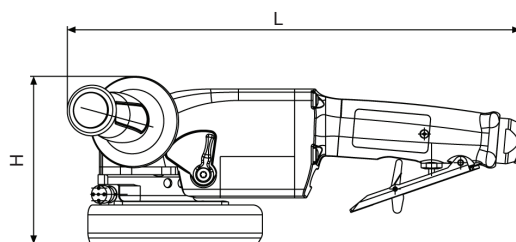
Krytování IP54 (without GW)
(obj. č. 6022802)



GW-xxx incl. protective cover IP54
(obj. č. 6022835A, 6023053A, 6023082A)

SPECIFICATIONS - ANGLE GRINDERS WITH DIQ TECHNOLOGY

The design series of the grinders GAQ originates from the Grinder series GA 1,9 kW. For grinding discs of type 27, 41/42: - Ø 125 mm, Ø 150 mm, Ø 180 mm, Ø 230 mm. Because of the reduced head height, it is possible to use these grinders in hard-to-reach areas. With vane motor.



For grinding discs	max. Ø	Ø 125 mm	Ø 150 mm	Ø 180 mm	Ø 230 mm
Safety lever on handle	Model	GAQ 812-190BX	GAQ 815-190BX	GAQ 818-190BX	GAQ 823-190BX
	Part No.	6061275E	6061275F	6061275G	6061275H
Speed (no load)	min ⁻¹	11 900	9 850	8 350	6 650
Max. power output	kW (hp)	1,9 (2.50)	1,9 (2.50)	1,9 (2.50)	1,9 (2.50)
Air consumption (no load)	m ³ /min (cfm)	1,0 (35.30)	1,0 (35.30)	1,0 (35.30)	1,0 (35.30)
Air consumption (loaded)	m ³ /min (cfm)	2,2 (77.7)	2,2 (77.7)	2,2 (77.7)	2,2 (77.7)
O.D. of grinding wheel	mm (in)	125 (4.92)	150 (5.91)	180 (7.09)	230 (9.06)
I.D. of grinding wheel	mm (in)	22,23 (.87)	22,23 (.87)	22,23 (.87)	22,23 (.87)
Max. thickness of grinding wheel	mm (in)	3; 4; 6 (12., 16., 24)	3; 4; 6 (12., 16., 24)	4; 6; 8 (16., 24., 32)	4; 6; 8 (16., 24., 32)
Max. thickness of cutting-off wheel	mm (in)	1; 1,6; 2 (.04., .06., .08)	1; 1,6; 2 (.04., .06., .08)	2,5; 3,2 (1.0., 1.3)	2,5; 3,2 (1.0., 1.3)
Max. radial speed	m/s (ft/s)	80 (262.5)	80 (262.5)	80 (262.5)	80 (262.5)
Hose ID required	mm (in)	16 (.63)	16 (.63)	16 (.63)	16 (.63)
Dimensions LxH	mm (in)	323x110 (12.7x4.3)	323x110 (12.7x4.3)	323x119 (12.7x4.7)	323x119 (12.7x4.7)
Max. cutting depth	mm (in)	30,5 (1.2)	43 (1.69)	58 (2.28)	83 (3.27)
Weight	kg (lbs)	3,1 (6.83)	3,1 (6.83)	3,3 (7.28)	3,6 (127.12)
Spindle thread		M14	M14	M14	M14
Air connection		thread 1/2" female	thread 1/2" female	thread 1/2" female	thread 1/2" female
Sound pressure level LpA according ČSN EN ISO 15744 (measurement uncertainty 3 dB)	dB	90	90	90	90
SouSound pressure power LwA according ČSN EN ISO 15744 (measurement uncertainty 3 dB)	dB	101	101	101	101
Vibration according ČSN EN ISO 28927-1 (measurement uncertainty 0,9 m/s ²)	m/s ²	2,8	2,3	2,9	3,7

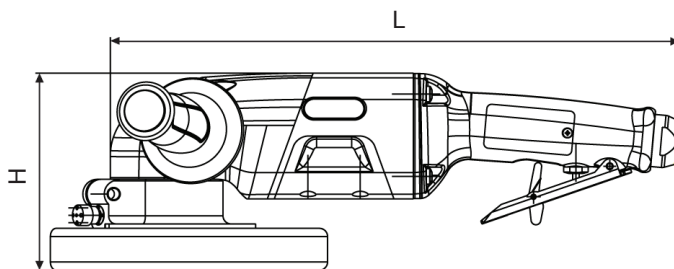
Specifications at 90 psi (6,3 bar)

Standard Equipment:	Part Number			
Hose nozzle G1/2"/LW 16	6013767	6013767	6013767	6013767
Pin wrench	828832	828832	-	-

Optional Accessories:	Part Number			
Plug	-	-	-	-
Swivel connector, G1/2"-12 mm, turnable	6078628	6078628	6078628	6078628
Nozzle, G1/2", turnable (around the axis)	6021377	6021377	6021377	6021377
Clamping nut (for type 41)	-	310186	310186	310186
Additional handle	-	-	-	6018524A
Safety Guard (for abrasive disks Typ 27, 41/42)	6022761A	6022730A	6022710A	6022710A
Oil set for oil change in head, oil 150 ml	6022831A	6022831A	6022831A	-
Device GW-ETH-02A (72D)	6080094	6080094	6080094	6080094
Device GW-ETH-02A (72D) incl. protective cover IP54	6022835A	6022835A	6022835A	6022835A
Device GW-ETH-02A (72D) IP54 (without GW)	6022802	6022802	6022802	6022802
Software BASIC (monthly license)	6078981	6078981	6078981	6078981
Software MASTER (annual license)	6078983	6078983	6078983	6078983
Software BASIC (monthly license)	6078982	6078982	6078982	6078982
Software MASTER (annual license)	6078984	6078984	6078984	6078984

SPECIFICATIONS - ANGLE GRINDERS WITH DIQ TECHNOLOGY

The design series of the grinders GAQ originates from the Grinder series 2,5 kW. For grinding discs of type 27, 41/42: Ø 180 mm, Ø 230 mm. Because of the reduced head height, it is possible to use these grinders in hard-to-reach areas. With vane motor.



For grinding discs	max. Ø	Ø 180 mm	Ø 230 mm
Safety lever on handle	Model	GAQ 818-250BX	GAQ 823-250BX
	Part No.	6060970D	6060971D
Speed (no load)	min ⁻¹	6 640	8 500
Max. power output	kW (hp)	2,5 (3.35)	2,5 (3.35)
Air consumption (no load)	m ³ /min (cfm)	1,3 (45.90)	1,5 (52.97)
Air consumption (loaded)	m ³ /min (cfm)	2,6 (91.81)	2,9 (102.40)
O.D. of grinding wheel	mm (in)	180 (7.09)	230 (9.06)
I.D. of grinding wheel	mm (in)	22,23 (.87)	22,23 (.87)
Max. thickness of grinding wheel	mm (in)	4; 6; 8 (.16,.24,.32)	4; 6; 8 (.16,.24,.32)
Max. thickness of cutting-off wheel	mm (in)	2,5; 3,2 (.10,.13)	2,5; 3,2 (.10,.13)
Max. radial speed	m/s (ft/s)	80 (262.5)	80 (262.5)
Hose ID required	mm (in)	16 (.63)	16 (.63)
Dimensions LxH	mm (in)	347x121 (13,67x7.76)	347x121 (13,67x7.76)
Max. cutting depth	mm (in)	54 (2.13)	79 (3.11)
Weight	kg (lbs)	4,4 (9.7)	4,7 (1.36)
Spindle thread		M14	M14
Air connection		thread 1/2" female	thread 1/2" female
Sound pressure level LpA according ČSN EN ISO 15744 (measurement uncertainty 3 dB)	dB	91,5	87
SouSound pressure power LwA according ČSN EN ČSN EN ISO 15744 (measurement uncertainty 3 dB)	dB	102,5	98
Vibration according ČSN EN ISO 28927-1 (measurement uncertainty 0,9 m/s ²)	m/s ²	1,6	4,2

Specifications at 90 psi (6,3 bar)

Standard Equipment:	Part Number	
Hose nozzle G1/2"/LW 16	6013767	6013767
Allen key 5 mm	800448	800448
O ring 18x2 mm	802517	802517

Optional Accessories:	Part Number	
Plug	6072227	6072227
Swivel connector, G1/2"-12 mm, turnable	6078628	6078628
Nozzle, G1/2", turnable (around the axis)	6021377	6021377
Additional handle	-	6018524A
Oil set for oil change in head, oil 150 ml	6022831A	-
Device GW-ETH-02A (72D)	6080094	6080094
Device GW-ETH-02A (72D) incl. protective cover IP54	6022835A	6022835A
Device GW-ETH-02A (72D) IP54 (without GW)	6022802	6022802
Software BASIC (monthly license)	6078981	6078981
Software MASTER (annual license)	6078983	6078983
Software BASIC (monthly license)	6078982	6078982
Software MASTER (annual license)	6078984	6078984

DEPRAG
machines unlimited



DEPRAG CZ a.s., T. G. Masaryka 113, 507 81 Lázně Bělohrad - Czech Republic
Tel.: +420-493 771 511, Fax: +420-493 771 623, E-mail: sales@deprag.cz, Internet: www.deprag.cz

Specifications subject to change without prior notice