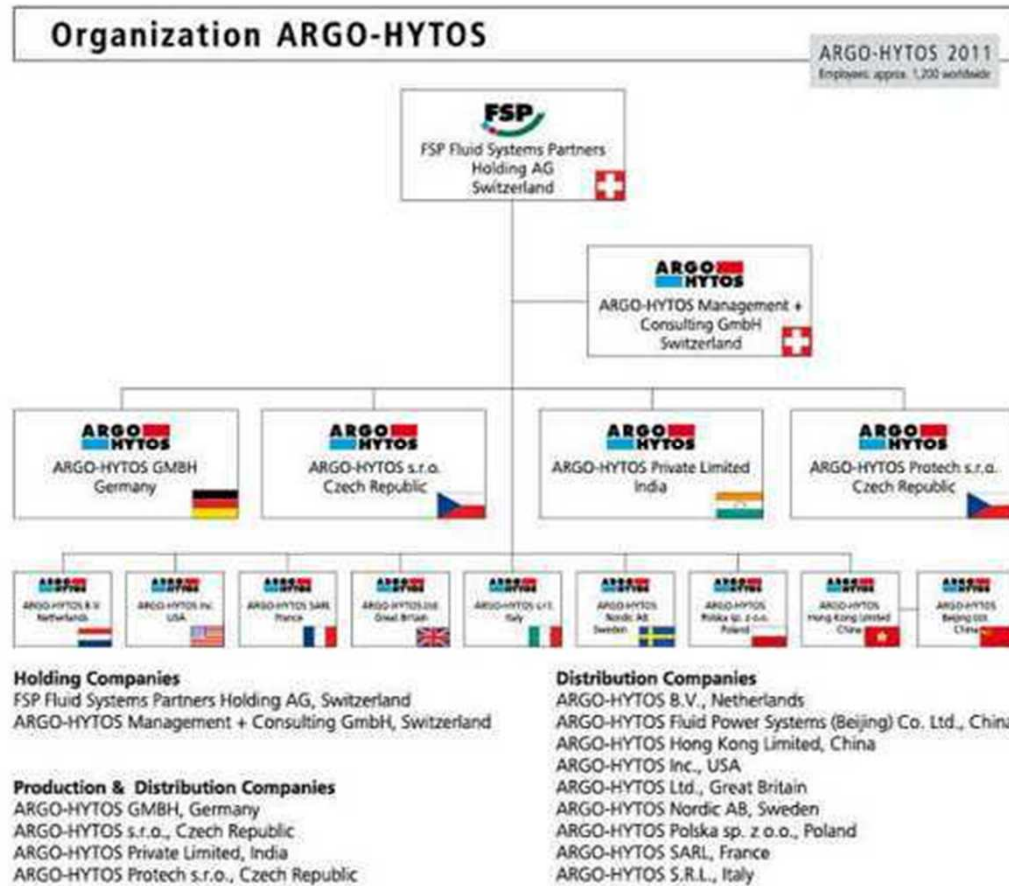




Presentation

ARGO-HYTOS Protech s.r.o.

Introduction – Organisation ARGO - HYTOS



Main information - year 2007

- turnover of organisation was above USD 178 millions
- employees approx. 1200
- main market: Germany 50%, Europe 40%, America 8%
- 70% of production was for primary producers, 30% - distribution companies
- filtration / fluid & motion control
 - 60 / 40
- rate of mobile / industrial hydraulics
 - 75 / 25



Introduction of HYTOS PROTECH Company



- History of the company:



- first experience with the hydraulics is dated back to the year 1964 – beginning of project engineering as a part of VÍTKOVICE Research and Development Department (10 employees);
- year 1990 – foundation of the project engineering department Hydraulics and Pneumatics in VÍTKOVICE Engineering (85 employees);
- year 1993 - PJ 944 VÍTKOVICE – divize podniky (65 employees);
- year 1994 - VÍTKOVICE Hydraulics and Pneumatics s.r.o. (55 employees);
- HYTOS PROTECH appeared when HYTOS a.s. Vrchlabí purchased VÍTKOVICE Hydraulics and Pneumatics s.r.o. – beginning of our company with a new name is dated January 1, 1997 (26 employees in the year 2008).
- From 12/2010 with new owner, directly connected with FSP

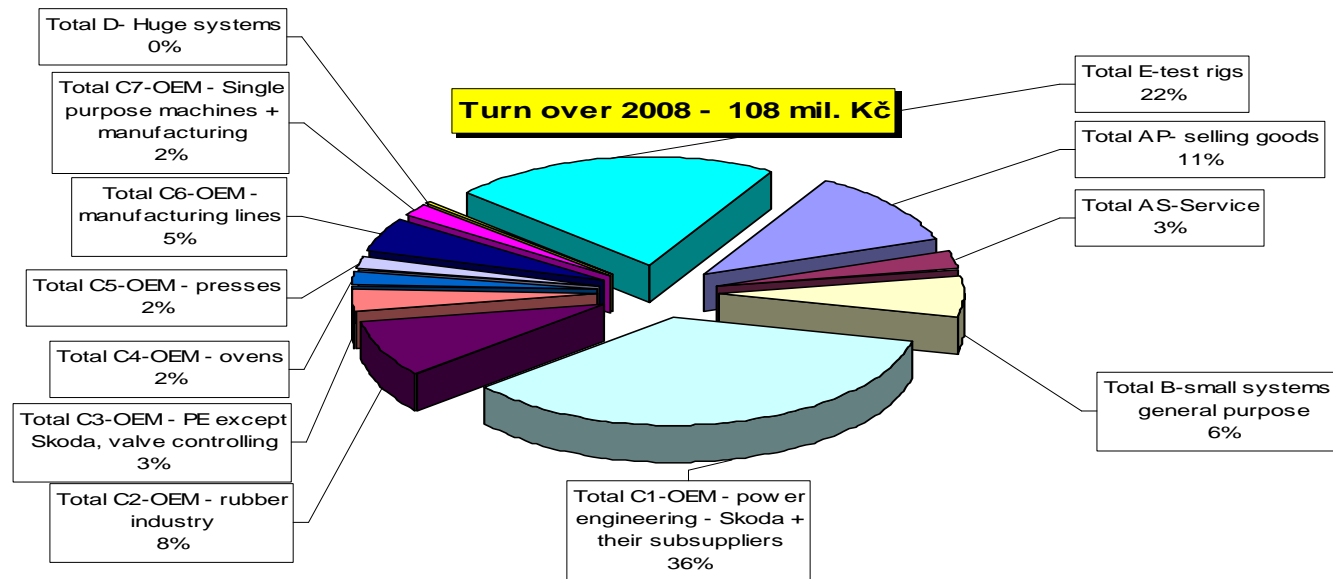
Introduction of HYTOS PROTECH Company



Basic activities:

- Hydraulics for various machinery and technological equipment in industry. The most important segments:
 - sales of articles of commerce (especially products of ARGO-HYTOS group) – **group AP**
 - service activities – **group AS**
 - custom-designed power units acc. to specific requirements – general industrial applications – **group B**
 - custom-designed power units especially for primary producers (OEM) – **group C**, subdivided into:
 - C1 – energy industry – Škoda Power and its subsuppliers
 - C2 – rubber industry
 - C3 – energy industry – other companies + controlling of armatures
 - C4 – furnaces
 - C5 – pressing machines
 - C6 – production lines
 - C7 – single-purpose machines, working machines
 - C8 – lubrication and cooling systems (a separate group since 2009)
 - C9 – wood and paper industry (a separate group since 2009)
 - C10 – water works (power plants, dams, weir gates, lifting bridges) (a separate group from 2010)
 - hydraulic systems of large size – **group D**
 - hydraulic systems – final products – test stands with hydraulics – **group E**
- we provide complete projects and deliveries in closed cycle:
PROJECT - DOCUMENTATION - PRODUCTION - ASSEMBLY - COMMISSIONING - SERVICE
- **year 2008 – turnover CZK 108 millions, gross profit CZK 17.6 millions**

Introduction of HYTOS PROTECH company



Group B – Custom–designed Hydraulic Power Units for General Purposes:

- **Distinctiveness:**

- compact solutions mostly – pressure source and control elements being part of a reservoir;
- low repeatability of identical equipment, supply of a few pieces yearly;
- mostly without terminal box or electro-control system;
- often with no demand for larger scope of supply – actuators (hydraulic cylinders, hydraulic motors), pipe-lines, commissioning;
- large portfolio of customers with occasional take-off and a number of end-users.

- **Main strong points - advantages:**

- possibility to use some concepts of “series hydraulic power units” of mother company ARGO–HYTOS Vrchlabí;
- bargain material input for products of ARGO–HYTOS and also for standard products of other suppliers of ARGO–HYTOS group (e.g. electromotors, gear and variable displacement pumps, accumulators and coolers, reservoirs etc.);
- customer service from large engineering organisation for reasonable price (know-how, high quality documentation, service group, availability of spare parts etc.).



Custom-designed HPU

- Serial No.: 08009
- Customer: DŘEVOSTROJ Čkyně ,a.s.
- Order No.: 8012/08
- Circuit diagram: 3-H-41 379, 3-H-41 381
- Implementation date: May 2008

- Main parameters:
 - reservoir volume 250/400dm³
 - pump variable displacement pump with pressure controller
 - electromotor 15/22 kW, 400/690 V, 1500 rpm
 - working pressure 11/10 MPa
 - working flow 90/130 dm³.min⁻¹
 - scope of delivery 2x2 hydraulic power units





Custom-designed HPU

- Serial No.: 08036
- Customer: ULBRICH HYDROAUTOMATIK s.r.o.
- Order No.: 8042/08
- Circuit diagram: 3-H-41 788
- Implementation date: July 2008

- Main parameters:
 - reservoir volume 100 dm³
 - pump double gear pump
 - electromotor 7,5 kW, 400/690 V, 1500 rpm
 - working pressure 14 MPa
 - working flow 20 dm³.min⁻¹
 - scope of dlivery hydraulic power unit

Customers – Group C1



Group C1 – Custom-designed Hydraulic Power Units for Škoda Power and its Subsuppliers (G-team, Tyco, Emmerson etc.):

- **Distinctiveness:**

- complex supply of hydraulics mostly – hydraulic power unit, servo-actuators, working fluid, pipe-lines, commissioning and training;
- taking into account the equipment sophistication (danger of large damages and financial losses) it is necessary to implement a lot of specific demands – see below;
- connection of electric items to terminal box mostly (especially on hydraulic power units) or by means of connectors Harting (on servo-actuators);
- longer time schedule of particular job orders, similarity of hydraulic systems;
- job orders implemented worldwide in years 2007-2008 – India, Pakistan, Finland, Denmark, Croatia, Germany and Russia, also lubrication and cooling systems in Romania, Chile, Turkey, Latvia.

- **Main strong points - advantages:**

- interesting price level, flexibility and adaptation by meeting the extremely high requirements set by branch and customer contrary to the dominant competitor Rexroth company especially as for turbines with lower output;
- making use of high technical erudition – see description of typical demands;
- effort to constantly improve and modify technical solutions unlike the opposite tendency to supply routinely.

Group C1 – Definition of the Basic Standards (Requirements) for Hydraulic Systems

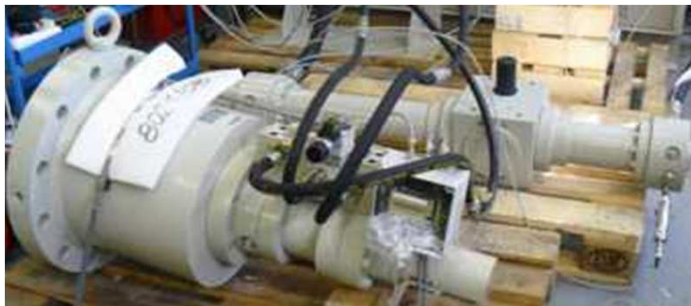
- **Hydraulic power unit – most frequent requirements:**
 - stainless steel reservoir with oil sump, enclosure of hydraulic power unit (noise and dirt);
 - redundancy of pressure source, accumulators with pressure fluid reserve for 3-4 cycles of servo-actuators;
 - multiple monitoring of working parameters of fluid (temperature, level, pressure);
 - utilization of synthetic, fire-resistant and biodegradable hydraulic fluid;
 - off-line unit for filling with working fluid, in special cases for fluid regeneration during operation.
- **Servo-actuators – most frequent requirements:**
 - dividing into 2 types of main function – stop valves and control valves actuators;
 - the main demand for stop valve actuators is short closing time – up to 200 ms with controlled reach the end position, safe position ensured by springs, redundancy of safety function, control by seat valves;
 - control pressure for stop valve actuators with the “function 2/3” – disconnection of at least two out of three electromagnets will ensure fast close of steam at the inlet of turbine;
 - servo-valves connected in the way that operational safety is increased;
 - adequate filtration without by-pass;
 - continual position monitoring in multiple (redundant) design.



Custom-designed HPU – High Pressure HS Fynsvaerket 38MW

- Serial No.: 08017
- Customer: ŠKODA POWER a.s.
- Order No.: 8021/08
- Circuit diagram: 1-H-41 575
- Implementation date: June 2008

- Main parameters:
 - reservoir volume 300 dm³, stainless steel
 - pump variable displacement + gear pump
 - electromotor 2x 7,5 kW, 400/690 V, 1500 rpm
 - working pressure 16 MPa
 - working flow 22+35 dm³.min⁻¹
 - scope of delivery hydraulic system



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Custom-designed HPU – High Pressure HS Fynsvaerket 38 MW



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Custom-designed HPU - Muridke

- Serial No.: 08055
- Customer: G - Team a.s.
- Order No.: 8061/08
- Circuit diagram: 1-H-41 980
- Implementation date: September 2008

- Main parameters:
 - reservoir volume 160 dm³, stainless steel
 - pump 2x T2-gear
 - electromotor 2x 7,5 kW, 400/690 V, 1455 rpm
 - working pressure 16 MPa
 - working flow 17,3 dm³.min⁻¹
 - scope of delivery hydraulic system

Custom-designed HPU – Flap Actuators



- Serial No.: 08068
- Customer: Tyco, s.r.o.
- Order No.: 8084/08
- Circuit diagram: 3-H-42 270
- Implementation date: March 2009

- Main parameters:
 - reservoir volume -
 - pump -
 - electromotor -
 - working pressure 16 MPa
 - working flow 10 dm³.min⁻¹
 - scope of delivery flap actuators

Group C2 – Rubber Industry (Main Customers – Buzuluk, Konštrukta Industry):

- **Distinctiveness:**

- hydraulic power units mostly – in special cases including actuators, pipe-lines and commissioning;
- specific demands regarding machines design concept are fulfilled – important criteria is to comply with safety demands set by specific norms and markets;
- hydraulic power units have character of repeatability within a number of pieces yearly;
- job orders implemented worldwide – mainly in China, India, Russia and former USSR countries.

- **Main strong points - advantages:**

- combination of above mentioned advantages (price, technical erudition – systems working in closed loop control);
- long term cooperation made communication during defining parameters for new machines easier, possible misunderstandings eliminated;
- good knowledge of know-how concerning particular technologies or machines and ability to suggest interesting solutions in comparison with standards of worldwide competitors;
- meeting the specific demands of customers.

Customers – Group C2



Group C2 – Main Machines

- **Buzuluk:**
 - mixing lines (hydraulics of mixers), cooling machines (if they are with hydraulic system);
 - two-roll mills (eventually completed by scrapping desks and stockblenders);
 - calandering lines (roller head, roller die, multiple-roll calanders);
 - tire testing machines.
- **Konštrukta :**
 - mono extrusion lines;
 - multi extrusion lines (duplex, triplex, quadroplex);
 - production of APEX.



Custom-designed HPU - Mixing Machine

- Serial No.: 08022
- Customer: BUZULUK Komárov a.s. .
- Order No.: 8026/08
- Circuit diagram: 1-H-41 541
- Implementation date: June 2008

- Main parameters:
 - reservoir volume 630 dm³
 - pump PV-axial piston
 - electromotor 37 kW, 400/690 V, 1500 rpm
 - working pressure 0,5 – 25 MPa
 - working flow 180/0-120 dm³.min⁻¹
 - scope of delivery hydraulic power unit



Custom-designed HPU - HS for Five-roll Mill

- Serial No.: 08045
- Customer: BUZULUK Komárov a.s.
- Order No.: 8051/08
- Circuit diagram: 1-H-42 071
- Implementation date: February 2009

- Main parametres:
 - reservoir volume 160 dm³
 - pump T2-gear
 - electromotor 0,55/7,5 kW, 230/ 400 V, 1500 rpm
 - working pressure 23 MPa
 - working flow 23/27,5 dm³.min⁻¹
 - scope of delivery hydraulic power unit



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Example of machines: Buzuluk – Mixer, Calandering Line - Two-roll Head



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Customer-designed HPU - Jaroslavl

- Serial No.: 08037
- Customer: KONŠTRUKTA INDUSTRY, a.s.
- Order No.: 8043/08
- Circuit diagram: 3-H-41 886, 888, 890, 892, 894
- Implementation date: August 2008

- Main parameters:
 - reservoir volume 60 dm³
 - pump T2-gear
 - electromotor 4 kW, 400/690 V, 1500 rpm
 - working pressure 28 MPa
 - working flow 8 dm³.min⁻¹
 - scope of delivery 5x hydraulic power unit



Example of machines: Konštrukta – Duplex and Triplex



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Group C3 – Energy Industry other customers + Controlling of Armatures

- **Distinctiveness:**

- hydraulic systems mostly – hydraulic power unit + actuators + pipe-lines + fluid + commissioning;
- hydraulic power units have character of repeatability within a number of pieces yearly;
- energy industry (Ekol Brno, AEZ, PBS Energo + reconstruction);
- controlling of armatures (energy industry: Tyco, Emersson, Polná, Armatury Group, G-team or steel making: Vesuvius, Vítkovice, Pilsen Steel - controlling of slide gates);
- job orders implemented especially in Europe – Poland, Bulgaria, Slovakia, the Czech Republic.

- **Main strong points - advantages:**

- we take advantage of energy industry know-how awareness arised from cooperation with Škoda Power;
- combination of above mentioned advantages (price, technical erudition – systems working in closed loop control).



Custom-designed HPU – High Pressure HS Chomutov

- Serial No.: 08067
- Customer: AEZ, s.r.o.
- Order No.: 8083/08
- Circuit diagram: 1-H-42 400
- Implementation date: November 2008

- Main parameters:
 - reservoir volume 160 dm³
 - pump 2x T2-gear
 - electromotor 2x 4 kW, 400/690 V, 1500 rpm
 - working pressure 21 MPa
 - working flow 10 dm³.min⁻¹
 - scope of delivery hydraulic system





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Custom-designed HPU – High Pressure HS Burgas (Bulgaria)

- Serial No.: 08074
- Customer: PBS ENERGO, a.s.
- Order No.: 8090/08
- Circuit diagram: 1-H-42 408
- Implementation date: February 2009

- Main parameters:
 - reservoir volume 160 dm³
 - pump 2x T2-gear
 - electromotor 2x 3 kW, 400/690 V, 1500 rpm
 - working pressure 21 MPa
 - working flow 7 dm³.min⁻¹
 - scope of delivery hydraulic system

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Example of machines:



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Customers – Group C4



Group C4 – Furnaces

- **Distinctiveness:**

- hydraulic systems mostly – hydraulic power unit + actuators + pipe-lines + commissioning;
- hydraulic power units have character of repeatability;
- job orders implemented in the Czech Republic mostly;
- whole range of customers - TPP Olomouc, BKB Metal, Dotec Energo, TTS Eko etc.

- **Main strong points - advantages:**

- combination of above mentioned advantages – especially price;
- reasonable solutions for manipulation with heavy loads – bell (gate door), latching device and emergency release of the bell (gate door).



Custom-designed HPU - HS of bell-furnace, Brück

- Serial No.: 08007
- Customer: TEPLOTECHNA PRŮM. PECE, s.r.o.
- Order No.: 8010/08
- Circuit diagram: 3-H-41397
- Implementation date: April 2008

- Main parameters:
 - reservoir volume 400 dm³
 - pump PV-axial piston
 - electromotor 30 kW, 400/690 V, 1500 rpm
 - working pressure 15 MPa
 - working flow 80 dm³.min⁻¹
 - scope of delivery hydraulic system

Custom-designed HPU - Boiler VESKO B 6,0 MW



- Serial No.: 08028
- Customer: TTS eko s.r.o.
- Order No.: 8034/08
- Circuit diagram: 3-H-41 596
- Implementation date: April 2008

- Main parametres:
 - reservoir volume 250 dm³
 - pump GHP3-D-50
 - electromotor 2x 18 kW, 400/690 V, 1500 rpm
 - working pressure 18 MPa
 - working flow 2x 50 dm³.min⁻¹
 - scope of delivery hydraulic system

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Example of implementations: Bell Furnace, Glowing Furnace



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Group C5 – Pressing Machines

- **Distinctiveness:**

- hydraulic systems mostly – hydraulic power unit + actuators + pipe-lines + commissioning;
- observation of the specific safety norms for pressing machines (forming, cutting, straightening and vulcanization) running in standard, differential connection or with filling valve;
- job orders implemented especially in the Czech Republic;
- the most important OEM – Dieffenbacher, Žďas, Müller Weingarten AG + reconstructions for the whole range of customers.

- **Main strong points - advantages:**

- combination of above mentioned advantages – especially price;
- option for dominant producer of pressing machines hydraulic systems – Rexroth, Parker;
- within the scope of reconstruction of hydraulic systems – covering the electro control.



Custom-designed HPU – HS of Pressing Machine 800 kN

- Serial No.: 08075
- Customer: DIFFENBACHER – CZ, s.r.o.
- Order No.: 8091/08
- Circuit diagram: 1-H-42 333
- Implementation date: January 2009

- Main parameters:
 - reservoir volume 400 dm³
 - pump gear
 - electromotor 1,5/30 kW, 230/400 V, 1500 rpm
 - working pressure 2,2-26 MPa
 - working flow 56,5/60 dm³.min⁻¹
 - scope of delivery hydraulic system

Custom-designed HPU – HS for General Overhaul of Pressing Machine CTC250



- Serial No.: 08060
- Customer: ArcelorMittal Ostrava a.s.
- Order No.: 8075/08
- Circuit diagram: 1-H-42 127
- Implementation date: November 2008

- Main parameters:
 - reservoir volume 400 dm³
 - pump P2-axial piston
 - electromotor 22 kW, 400/690 V, 1500 rpm
 - working pressure 2-25 MPa
 - working flow 51,5+43 dm³.min⁻¹
 - scope of delivery electro-hydraulic system

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Example of Pressing Machines – Dieffenbacher Company



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Group C6 – Production Lines

- **Distinctiveness:**

- hydraulic systems mostly – hydraulic power unit + valve tables or manifolds + pipe-lines + commissioning;
- the design is to be defined in accordance with a production type and customer requirements;
- job orders implemented especially in the Czech Republic;
- this refers as to primary producers so to reconstructions at end users facilities:
 - foundry lines (TMT, Mencl Guss, Kasi, Metakon etc.)
 - manufacturing of metal plates, tubes (ITS Benda, Ingeteam, BKB Metal, MEZ Mohelnice, Tranza, Železářny Podbrezová etc.).

- **Main strong points - advantages:**

- combination of above mentioned advantages – especially price;
- complex of services, ability to find the solution for the whole range of prototype machines on the base of our experience with similar applications / problematics.



Custom-designed HPU - HPU + Manifolds for PoDL Pragmet

- Serial No.: 08016
- Customer: ITS BENDA s.r.o.
- Order No.: 8020/08
- Circuit diagram: 2-H-41 514
- Implementation date: April 2008

- Main parameters:
 - reservoir volume 400 dm³
 - pump variable displacement piston pump
 - electromotor 22 kW, 400/690 V, 1500 ot.min⁻¹
 - working pressure 16 MPa
 - working flow 88,5/63 dm³.min⁻¹
 - scope of delivery hydraulic power unit





Custom-designed HPU - HS of Thermoflattening Line

- Serial No.: 08038
- Customer: Ingeteam a.s.
- Order No.: 8044/08
- Circuit diagram: 1-H-41764, 1-H-41765, 1-H-41768, 1-H-41772, 1-H-41774, 1-H-41770, 1-H-41784
- Implementation date: July 2008
- Main parameters:
 - reservoir volume 400/1000 dm³
 - pump PV-axial piston
 - electromotor 0,37/0,55/0,75/1,5/15/37 kW, 400/690 V, 1500/900 rpm
 - working pressure 10 MPa
 - working flow 50+52+30 dm³.min⁻¹
 - scope of delivery hydraulic system



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Example of the Production Line



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Group C7 – Single-purpose Machines and Working Machines, Traction Vehicles

- **Distinctiveness:**

- hydraulic systems mostly – hydraulic power unit;
- the design is to be defined in accordance with a production type and customer requirements, as for primary producer the design is characterized by repeatability of production;
- job orders implemented according to customer range (traction vehicles – especially Russia);
- it refers to primary production and also to reconstruction – especially for working machines:
 - working machines (TOS Čelákovice a.s., Tajmac–ZPS, Strojtos etc.) – domain of mothers company
 - single-purpose machines – blanking (Elvac achinery, Sirius, Inteso)
 - reconstruction of working machines (Vítkovice Mechanika etc.)
 - traction (MTH Praha)

- **Main strong points - advantages:**

- combination of above mentioned advantages – especially price.



Custom-designed HPU – Working Machine

- Serial No.: 07050
- Customer: TOS a.s.,
- Order No.: 7063/07
- Circuit diagram: 1-H-40 403
- Implementation date: August 2007

- Main parameters:
 - reservoir volume 180 dm³
 - pump double gear
 - electromotor 1,1/1,5kW, 230/400 V, 1500 rpm
 - working pressure 6/2,5 MPa
 - working flow 8+3 dm³.min⁻¹
 - scope of delivery hydraulic power unit + electro

Custom-designed HPU - Punching Machine ELROB



- Serial No.: 08063
- Customer: ELCOM MACHINERY, s.r.o.
- Order No.: 8079/08
- Circuit diagram: 3-H-42 212
- Implementation date: September 2008

- Main parameters:
 - reservoir volume 120 dm³
 - pump T2-gear
 - electromotor 1,5/7,5 kW, 230/400 V, 1500 rpm
 - working pressure 145 bar
 - working flow 28+14 dm³.min⁻¹
 - scope of delivery hydraulic power unit



Custom-designed HPU – Hydraulic System

- Serial No.: 07099
- Customer: MTH Praha a.s.
- Order No.: 7124/07
- Circuit diagram: 1-H-40 667
- Implementation date: January 2008

- Main parameters:
 - reservoir volume 400 dm³
 - pump variable piston pump with pressure controller
 - electromotor 55 kW, 400/690 V, 1500 rpm
 - working pressure 18/20 MPa
 - working flow 58-90/70 dm³.min⁻¹
 - scope of delivery hydraulic power unit

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Example of Machines – Ballast Plough, Milling Machine OFA



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Group C8 – Lubrication and Cooling Systems

- **Distinctiveness:**

- the design is to be defined in accordance with a production type and customer requirements, as for primary producer the design is characterized by repeatability of production. Specific requirements for working fluids with high viscosity, the method of cooling and cooling performance, redundancy etc.);
- simple lubrication systems with low repeatability are classified into Group B or may be a part of high pressure system - for example the Group C7 for machine tools.
- job orders implemented according to customer range - generally the whole world using representatives of Argo-Hytos;
- it refers to primary production – especially for energy industry respectively energy transmissions – Wikov MGI, PBS Energo and others, such as AVL Moravia;

- **Main strong points - advantages:**

- in many cases, knowledge and ability to supply also the high pressure part – for example the high pressure control system of steam turbines or water power plants;
- combination of above mentioned advantages – especially price.



Custom-designed HPU – Lubrication and Cooling System for Transmission of Water Power Plant

- Customer: Wikov MGI a.s.
- Order No.: 10 020/10
- Circuit diagram: 3-H-43 530
- Implementation date: June 2010

- Main parameters:
 - reservoir volume 700 dm³ (a part of transmission)
 - pump gear pump – Sauer-Danfoss
 - electromotor 2x 5,5kW, 400 V, 4 and 6-pole
 - working flow 130 + 180 dm³.min⁻¹
 - working pressure separátní mazací a chladicí systém
 - free parts (photo of testing)





Custom-designed HPU – Lubrication and Cooling System of Steam Turbine

- HPU No.: 09028
- Customer: PBS ENERGO, a.s.
- Order No: 9036/09
- Circuit diagram : 3-H-42 955
- Implementation date: November 2009
- Main parameters :
 - reservoir volume 250 dm³
 - pump 3x QP-80
 - electromotor 2x1,5/0,82 kW, 230/400 V, 1500 rpm
 - working pressure 0,3 MPa
 - working flow 3x 0-80 dm³.min⁻¹
 - scope of delivery hydraulic system



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Custom-designed HPU – for lubrication

- HPU No.: 09031
- Customer: AVL Moravia s.r.o.
- Order No: 9041/09
- Circuit diagram: 3-H-42 834
- Implementation date: June 2009

- Main parameters:
 - reservoir volume 60 dm³
 - pump P2- gear pump
 - electromotor 1,5 kW, 230/400 V, 900 rpm
 - working pressure 12 / 17 MPa
 - working flow 1,9 / 3 dm³.min⁻¹
 - scope of delivery 4 x HPU

Customers – Group C9



- Group C9 – Wood and Paper Industry
- **Distinctiveness:**
 - the design is to be defined in accordance with a production type and customer requirements, as for primary producer the design is characterized by repeatability of production, especially companies Dřevostroj Čkyně a.s. and Papcel a.s;
 - job orders implemented according to customer range
- **Main strong points - advantages:**
 - combination of above mentioned advantages – especially price.

Custom-designed HPU - cross-cutting and edging



- HPU No.: 09021
- Customer : DŘEVOSTROJ Čkyně ,a.s
- Order No: 9029/09
- Circuit diagram : 3-H-42 747
- Implementation date : May 2009

- Main parameters :

 - reservoir volume 160 dm³
 - pump LRR030DRP1610
 - electromotor 7,5 kW, 400-690 V, 1500 rpm
 - working pressure 10 MPa
 - working flow 43 dm³.min⁻¹
 - scope of delivery HPU

Customers– Group C10



- Group C10 – water works (power plants, dams, weir gates, lifting bridges etc.)
- **Distinctiveness:**
 - the design is to be defined in accordance with a production type and customer requirements, as for primary producer the design is characterized by repeatability of production;
 - manufacturers of water turbines and accessories are dominant in this group;
 - job orders implemented according to customer range - generally the whole world using representatives of Argo-Hytos;
 - it refers to primary production – companies Mavel, ČKD Blansko Small Hydro, Armatury Group, Strojírny Podzimek
- **Main strong points - advantages:**
 - specific problems for water turbines respectively water works as a whole;
 - combination of above mentioned advantages – especially price.



Custom-designed HPU - Regulation MVE

- Customer: Mavel, a.s.
- Order No: 10 007/10
- Circuit diagram: 3-H-43 383
- Implementation date: March 2010

- Main parameters:
 - reservoir volume 160 dm³
 - pump gear pump + accumulator
 - electromotor 7,5 kW, 400 V, 1500 rpm
 - working pressure 15 MPa
 - scope of delivery hydraulic power unit for regulation of Kaplan turbine

Group D –Hydraulic Systems of Large Size

- **Distinctiveness:**
 - complex hydraulic systems mostly – hydraulic power unit + actuators + pipe-lines + commissioning;
 - the design is to be defined in accordance with a production type and customer requirements;
 - job orders implemented in the Czech Republic;
 - low chance of repeatability, irregularity of job orders;
 - branches of heavy industry– steel production and manufacturing;
 - it refers to final users – new installations + reconstructions;
 - customers: Vítkovice Heavy Machinery, Evraz, ArcelorMittal Ostrava a.s., Paul Wurth, TMT.
- **Main strong points - advantages:**
 - combination of above mentioned advantages – especially price and system complexity;
 - option for strong transnational leaders – especially BR.

Custom-designed HPU - HS of Tilting Stand



- Serial No.: 05049
- Customer: VÍTKOVICE HEAVY MACHINERY
- Order No.: 5123/05
- Circuit diagram: 3-H-38 534
- Implementation date: May 2006

- Main parameters:
 - reservoir volume 1 000 dm³
 - pump 2x A10VSO - axial piston
 - electromotor 2x 22 kW, 500 V, 1460 ot.min⁻¹
 - working pressure 12 MPa
 - working flow 80 dm³.min⁻¹
 - scope of delivery hydraulic system



Custom-designed HPU - HS of Manipulator

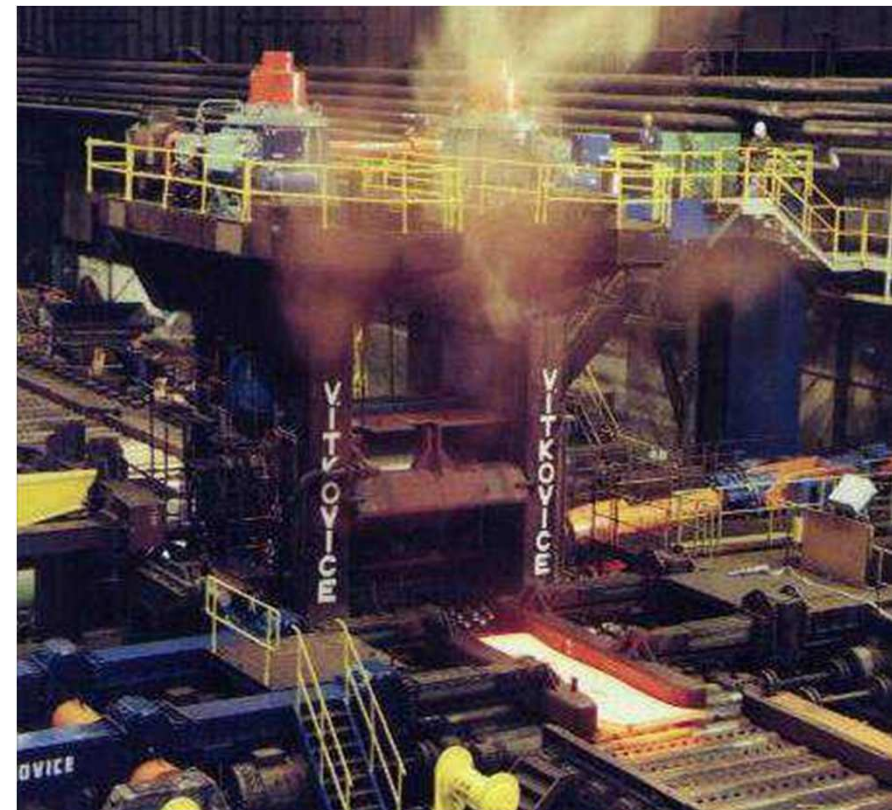
- Serial No.: 05049
- Customer: Mittal Steel Ostrava a.s.,
- Order No.: 5142/05
- Circuit diagram: 1-H-38 861
- Implementation date: June 2006

- Main parameters:
 - reservoir volume 5000 dm³
 - pump 3x variable axial piston pump with pressure controller
 - electromotor 3x 37 kW, 400 V, 1475 rpm
 - working pressure 21,5 MPa
 - working flow 3x 98 dm³.min⁻¹
 - scope of delivery hydraulic power unit



Group D - Examples

Example of Systems – Tilting Stand, 3.5m Four-High Rolling Mill



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Group E – Hydraulic Test Stands

- **Distinctiveness:**

- final product – we cover also mechanical part and control system including visualization;
- the design is to be defined in accordance with a test type (e.g. definition by norm) and customer requirements;
- low chance of repeatability – to a great extent unique products;
- test stands for new items development and also for series testing;
- especially for companies from hydraulic branch (testing of hydraulic items, filters, custom-designed manifolds);
- it refers to manufacturers of product (final customers from our point of view);
- customers: ARGO-HYTOS, Integrated, Sauer Danfoss, Mann+Hummel.

- **Main strong points - advantages:**

- high level of technical know-how in hydraulics branch + cooperation with prestigious companies in the field of control, data collecting and storing enable us to supply sophisticated systems and fulfill extreme requirements, e.g. testing of components for automobile industry;
- complexity and references – systems with wide range of parameters, high pressures and high frequent tests.



Custom-designed HPU – Test Stand L040 for Pressure Relief Valves

- Serial No.: 08019
- Customer: ARGO-HYTOS, s.r.o.
- Order No.: 8023/08
- Circuit diagram: 1-H-41 546
- Implementation date: June 2008

- Main parameters:
 - reservoir volume 400 dm³
 - pump a3D135+i1D4+p1D4 triple gear
 - electromotor 1,1/4/30 kW, 230/400/690 V, 1500/900 rpm
 - working pressure 2x37/130/3,6 MPa
 - working flow 42 dm³.min⁻¹
 - scope of delivery test stand



Custom-designed HPU – Test Stand GP3

- Serial No.: 08023
- Customer: Integrated Hydraulics Ltd
- Order No.: 8028/08
- Circuit diagram: 1-H-39 860/A
- Implementation date: May 2008

- Main parameters:
 - reservoir volume 1300 dm³
 - pump T6C-031, PV023, PR4-3X/3
 - electromotor 3/2,2/22/4/1,1/11/4 kW, 415/3x415 V, 1420/940/1470/1440/915 rpm
 - working pressure 2x37/130/3,6 MPa
 - working flow 142/3,1/33/4,8/1,3/13,1/4,6 dm³.min⁻¹
 - scope of delivery test stand



Custom-designed HPU – Test Stands for Hydraulic Power Units

- Serial No.: 08041
- Customer: ARGO-HYTOS, s.r.o.
- Order No.: 8047/08
- Circuit diagram: 1-H-42 176
- Implementation date: October 2008

- Main parameters:
 - reservoir volume 250 dm³
 - pump gear
 - electromotor 0,45/0,25 kW, 400 V, 2700/1400rpm

 - working pressure 35 MPa
 - working flow 16/8 dm³.min⁻¹
 - scope of delivery test stands for HPU - 5 pcs

Group D - Examples

Example of Test Stands Implementation – Integrated, ARGO-HYTOS



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ARGO-HYTOS Protech s.r.o.
Pohraniční 27, OSTRAVA - VÍTKOVICE, 706 02, CZ

Conclusion



- our company focuses on system solutions (engineering company);
- scope of our deliveries includes as small hydraulic “custom-designed” power units so large size systems on key-delivery base, where we take advantage of know-how and power of ARGO–HYTOS group;
- typical closed cycle:
PROJECT – DOCUMENTATION – PRODUCTION – ASSEMBLY – COMMISSIONING – SERVICE

- Address:

ARGO-HYTOS Protech s.r.o.

Pohraniční 27

706 02 OSTRAVA

Tel. : +420 59 595 6776, +420 59 6633873

Fax : +420 59 595 5696

E-mail : protech@hytosost.cz ,

www.argo-hytos-protech.eu