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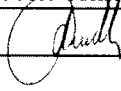
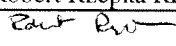
**FLUOR**®

## MATERIAL REQUISITION FOR CENTRIFUGE (WITH HYDRACYCLONE)

**EQUIPMENT NO.: 24, 24C**

**DOCUMENT NO.: A5NU 0001 55 S013 0**

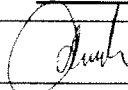
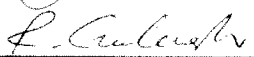
This requisition has been revised as indicated below and described in the revision record on the following page.  
Please destroy all previous revisions.

Revision No.	Date	Originator's Name & Initials	Checked By Name & Initials	Pages
0	21.06.2010	Robert Oslislok RPO 	Robert Rzepka RRZ 	all

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<u>APPROVALS</u>	<u>NAME</u>	<u>SIGNATURE</u>	<u>DATE</u>
Lead Engineer:	Robert Oslislok		24.06.10
Project Manager:	Radomir Gulczewski		24.06.10
Client Representative:			



**STATUS :**  Released for Design  Released for Construction  Other Issue for Inquiry

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## 1. INTRODUCTION

This requisition covers the minimum requirements for the engineering, design, manufacturing, inspection, testing, preparation for transportation and supply of Centrifuge together with hydrocyclone as mentioned in this requisition and Datasheet forming part of this requisition.

The Equipment will form part of the Synthos “Opracowanie i wdrożenie nowych rodzajów EPS przyjaznych środowisku” project located in Oswiecim, Poland.

## 2. APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

### 2.1. Parties involved and definitions

Definitions are located in Commercial Part.

### 2.2. General

The codes, standards and specifications listed in this section form an integral part of this requisition. Each publication shall be the latest revision or addendum in effect on the date of issue of the purchase order, unless stated otherwise.

“BIDDER” shall give a clear statement in his bid to confirm his compliance with all applicable requirements as referred to herein.

### 2.3. Regulatory Requirements

The equipment shall, where relevant, be manufactured and certified in accordance with the applicable EC Directives, such as:

- 97/23/EC Pressure Equipment Directive (PED)
- 2006/95/EC Low Voltage Directive (LVD)
- 2004/108/EC Electromagnetic Compatibility (EMC) Directive
- 2006/42/EC Machinery Directive (MD)
- 94/9/EC Equipment Explosive Atmospheres (ATEX)
- 2004/22/EC Measuring instruments Directive



The equipment / packaged unit shall have the appropriate CE marking and manufacturer’s Declaration of Conformity (DOC). In case of Machinery, the Declaration of Conformity shall be as per annex II, sec. I, A.

Conformance to the regulations is the responsibility of the “BIDDER” and all services and documentation associated with the design approvals and inspection by the Authorities and other parties such as the Notified Body (NoBo) are part of “BIDDER’s” scope of supply.

“BIDDER” shall obtain all formal approvals for the equipment where applicable and required by authorities.

For each equipment, protective systems and component to be installed in hazardous areas the “BIDDER” shall provide the relevant CE marking and Declarations of Conformity of its sub-suppliers.

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## 2.4. Codes, Standards & Specifications

### 2.1.1 (Inter) national Codes and Standards

- DIN EN 60034 Rotating Electrical Machines.
- EN 10204 Metallic products – Types of inspection documents.
- ISO 3744 Noise measurements at equipment.
- ISO 1940 Mechanical vibration - Balance quality requirements for rotors in a constant (rigid) state.
- PN-EN 05204 Protection against static electricity. Protection of buildings installation and equipment. Requirements.
- PN-IEC 60364 Electrical installations of buildings.
- PN-EN 60073 Basic and safety principles for man-machine interface, marking and identification. Coding principles for indicators and actuators.
- PN-EN 60446 Basic and safety principles for man-machine interface, marking and identification. Identification of conductors by colours or numerals.
- PN-EN 60529 Degrees of protection provided by enclosures (IP Code).
- PN-EN 61000 Electromagnetic compatibility (EMC).
- PN-EN 61340-5-1 Electrostatics. Part 5-1: Protection of electronic devices from electrostatic phenomena. General requirements.
- PN-EN 61340-5-2 Electrostatics. Part 5-2: Protection of electronic devices from electrostatic phenomena. User guide.

Subject Codes and Standards are assumed to be in “BIDDER’s” possession.



## 2.5. Order of precedence

In case of conflicting requirements the following descending order of precedence shall be used:

- 1 Regulatory Requirements
- 2 The formal Purchase Order
- 3 Material Requisition
- 4 Equipment Datasheet / Requisition sheets
- 5 “BIDDER’s” standard engineering practice

In case of conflicts “BIDDER” shall inform “ORDERER” and shall obtain a written approval how to proceed.

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## 2.6. Deviations

No deviations shall be allowed from statutory requirements. Deviations from listed codes, standards and engineering specifications are only acceptable if agreed and included in a deviation list that will be part of the Purchase Order Requisition. Any such deviations shall be stated in "BIDDER's" quotation.

## 3. EXTENT OF SUPPLY

### 3.1. "BIDDER" responsibility

The "BIDDER's" overall responsibility shall include, but is not limited to:

- a) Project Management for all the work performed by "BIDDER" as well as for the work performed by his Sub-suppliers, including all components and services.
- b) Engineering, design, procurement, manufacturing, testing, inspection, expediting and preparation for transportation of supplied equipment.
- c) Submission of all documentation specified in this requisition.
- d) Quality Assurance and Control (QA/QC) to ensure compliance with statutory requirements, requirements in this requisition and delivery of equipment within specified time.
- e) Obtaining all approvals required by the approved inspection authority.
- f) Supply of the Certificate of Conformity, Declaration of Conformity and User Manual in the Polish language.

Compliance with the contents of this requisition does not relieve the "BIDDER" of his responsibility to furnish equipment of proper design, workmanship and materials to meet the specified requirements.

All equipment supplied by the "BIDDER" shall be within the range of "BIDDER's" proven experience and shall not involve the use of any prototype design or component.

### 3.2. Equipment Scope of Supply

"BIDDER" shall supply the Equipment completely furnished as specified in this requisition.

<u>Tag no</u>	<u>Number required</u>	<u>Description</u>
24	1	<b>Centrifuge</b>
24C	1	<b>Hydrocyclone</b>

"BIDDER's" scope of supply shall include as a minimum, but shall not be limited to the following:

- 3.2.1 All electrical equipment, which is dedicated to the equipment like e.g. electric motors, static frequency converters, cable glands, etc.
- 3.2.2 All instrumentation equipment required for suitable operation of the unit.
- 3.2.3 All instrument wiring between instruments and junction boxes of the unit.
- 3.2.4 Electrical cabling, if applicable, between Terminal box/switch on the unit and the electrical equipment and/or installations.
- 3.2.5 Lube oil skids completely hooked up to bearings including lube oil coolers, lube oil filters, lube oil heater, tank, pumps, magnetic drain plugs, pressure relieves, temperature control valves and temperature indicators, flow control and high pressure

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- switches.
- 3.2.6 All flush connections at “BIDDER’s” battery limit
  - 3.2.7 Earthing of unit installed equipment, instruments, and the like to main earthing bar(s) on the unit.
  - 3.2.8 All junction boxes, internal wiring and blindplugs for outgoing (multicore) cable.
  - 3.2.9 All instrument air supply, tubing, (sub) headers, from “ORDERER’s” interface to the instrument equipment (if applicable).
  - 3.2.10 All instrument process piping, including instrument manifolds, fittings, tubing, adapters, etc.
  - 3.2.11 All cable support from instrument and/or electrical equipment up to the Terminal box.
  - 3.2.12 All piping within the skid limits up to one interface connection for each system.
  - 3.2.13 For all utilities and power, “BIDDER” shall define one common point at the equipment battery limit for “ORDERER” to connect to. Distribution from these points to all consumers is within “BIDDER’s” scope.
  - 3.2.14 All steelwork for supports and connection at “BIDDER’s” battery limit of above mentioned.
  - 3.2.15 Surface preparation and painting.
  - 3.2.16 Noise attenuating measures (enclosure).
  - 3.2.17 2 earthing bosses / earthbars to be provided located diametrically at opposite ends of the skid for connection of “ORDERER” earth cables. Earthing lug at each flange.
  - 3.2.18 Nameplates with bracket.
  - 3.2.19 Stud bolts, nuts and gaskets for all vents, drains and all other nozzles indicated to be provided with a blind flange.
  - 3.2.20 Start-up and commissioning spare parts (see item 3.5).
  - 3.2.21 Preservation and packing for shipment.
  - 3.2.22 Provisions for lifting and transportation.
  - 3.2.23 First charge of lubricant.
  - 3.2.24 Special tools for maintenance (if required).
  - 3.2.25 Preparation for shipment.
  - 3.2.26 All documentation as required per chapter 7.

### 3.3. Scope of services included

“BIDDER’s” scope of services shall include as a minimum, but not be limited to the following:

- 3.3.1 Mechanical and performance guarantee.
- 3.3.2 Engineering, design, procurement, inspection, testing and supply of all necessary equipment and material. BIDDER shall remain ultimately responsible for any and all testing of equipment, as required in this requisition and for the successful start-up of all systems after field installation.
- 3.3.3 Testing and commissioning of E&CS equipment.
- 3.3.4 Attendance to the SAT.
- 3.3.5 All documentation as described in chapter 7, including software programming information (if applicable).
- 3.3.6 Formal approvals for instruments and/or control equipment were applicable and required by authorities.
- 3.3.7 All necessary mechanical, instrumentation and electrical installation works, except where specifically excluded.
- 3.3.8 Expediting and inspection of equipment and any required materials for a timely delivery.
- 3.3.9 Authority approvals (if applicable).
- 3.3.10 CE marking.
- 3.3.11 All documentation associated with the involvement of the Notified Body (where

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- applicable).
- 3.3.12 All required tests and inspections, including Non-Destructive Examination.
  - 3.3.13 Quality Assurance and Control (QA/QC) to ensure compliance with the statutory requirements and the requirements in this requisition.
  - 3.3.14 Quality control, inspection and testing of the individual equipment at BIDDER's shop.
  - 3.3.15 Foundation design loads and locations.
  - 3.3.16 Sizing of the foundation bolts.
  - 3.3.17 Submission of all installation, operation and maintenance manuals etc. required for a safe and trouble free start-up, shutdown, emergency stop and unattended mode of operation.
  - 3.3.18 Providing and cataloging spare parts for installation and start-up.

### 3.4. Options

“BIDDER” shall provide separate pricing for the following options:

- 1. Supervision of installation, testing & commissioning on site on unit rate basis
- 2. Installation and Start-up Spares;
- 3. Spares for 2 years of operation;
- 4. Capital spares.

### 3.5. Spare parts

#### 3.5.1 Installation and Start-up

a) “BIDDER” shall recommend spare parts for Installation and Start-up according to his experience.

#### 3.5.2 2 years operating

a) “BIDDER” shall recommend spare parts for 2 years operating according to his experience.

### 3.6. Supply and services excluded

The following is excluded from the “BIDDER's” scope of supply:

- 3.6.1 Civil work, such as concrete/steel foundations
- 3.6.2 Electrical power supplies, protection and switching to electrical consumers.  
Electrical power cables to skid mounted equipment e.g. motors, process heaters, motor space heaters etc.
- 3.6.3 Lighting installations
- 3.6.4 Earthing of the main unit to the main earthing grid
- 3.6.5 Piping and piping supports outside scope of supply
- 3.6.6 Installation at site (except when agreed otherwise)

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## 4. TECHNICAL DESIGN / FABRICATION REQUIREMENTS

### 4.1. Process Description

#### 4.1.1 General

Equipment described in this requisition will form part of EPS production line.

### 4.2. General Design requirements

“BIDDER” shall only use equipment with proven technology.

Equipment shall be capable of continuous year round operation.

For area classification see attached Data Sheet.

### 4.3. Site Data

#### 4.3.1 Inside building

Building C-110

	Temp. °C	Humidity %
min.	5	20
max.	45	95

### 4.4. Electrical Power Data

Voltage 400V/230V  $\pm$  10% TN-S

Frequency 50 Hz  $\pm$  5%

### 4.5. Materials Requirements

- The use of asbestos in any form is strictly forbidden.
- All elements in contact with (wetted by) product shall be made of 1.4571 Stainless Steel or better.

### 4.6. Material Certification



Materials shall be provided with material certification in accordance with EN 10204 3.1 for process wetted parts.

### 4.7. Mechanical Requirements

Equipment shall be supplied completely pre-assembled (except hydrocyclone which can be delivered separately).

The BIDDER shall be aware that the production line is vulnerable to contamination of all materials that are not a part of the product. The equipment must not be a source of any contamination. It must not allow for accumulation of foreign materials.

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Lubrication system has to be positively separated from product. No contamination by lubricants is allowed.

Equipment and wiring shall be suitable for the site conditions (see item 4.3) and the area classification as specified (see Data Sheet).

All equipment shall be arranged so that maintenance of the components may be accomplished in place, or the components readily removed from the unit.

Lubrication points shall be clearly marked and readily accessible.

Rotation direction shall be clearly marked on the casing by permanent means.

All rotating parts shall be suitably protected on all sides by removable spark free drive guards and shall meet the applicable European Directives.

All drive guards shall allow visual inspection of the enclosed drive components without removing the guard.

#### 4.8. Bearings

The rotating assembly shall be supported by oil lubricated bearings. Bearings shall be from a European manufacturer.

Bearing life shall exceed 25,000 hours.

#### 4.9. Balancing and Vibrations

The assembly shall be statically and dynamically balanced according ISO 1940. The balance quality grade shall be G 2.5.

#### 4.10. Process Design

Process data are described at attached Data Sheet.

#### 4.11. Noise Requirements

The new site is subject to rigorous noise control. For this reason, Low-noise equipment shall be selected by default. The maximum sound pressure level at one meter from the equipment (source) shall not exceed 85 dB(A). The maximum allowable sound power level for the equipment is 135 dB.



The more stringent of these two criteria shall apply.

In case equipment does not comply with above "BIDDER" is obligated to provide relevant enclosures together with equipment.

#### 4.12. Electrical & Instrumentation Requirements

##### 4.12.1LV Motors

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“BIDDER” is responsible of the proper sizing and selecting of electric motors to meet the driven equipment’s operational requirements, e.g. torque and speed range and the electrical equipment. Attached LV-Motor datasheet shall be filled in by “BIDDER” and submitted to “ORDERER” as specified in point 7.

#### 4.12.2 Approved Suppliers for Electrical Equipment

LV motors shall be made by Polish manufacturer as specified below:

- CELMA
- INDUKTA
- BESEL
- TAMEL

#### 4.12.3 Instrumentation Requirements

“BIDDER” to supply the equipment package with field instrumentation completely installed.

Instrumentation shall be selected according to “BIDDER’s” standard and shall suit the intended purpose. The following shall apply to all instruments provided by “BIDDER”:

- a. Digital signals Hermetically sealed dry-contact, DPDT for 24 VDC. The contact shall be suitable for handling 1A max and 5mA minimum. Shattering shall be prevented
- b. Ingress protection Indoor: minimum IP65
- c. Instrument cable gland Stainless Steel or Plastic, M20x1.5 for braided cable.
- d. Main material of construction shall be Stainless Steel

Signals which are required to be transferred to “ORDERER’s” system shall include as a minimum, but shall not be limited to the following:

- centrifuge overloading (coupling sensor)
- minimal lube oil pressure
- lube oil pressure (local indication)

In case of non compliance “BIDDER” shall provide a list of deviations.

Instruments shall be tested in accordance with manufacturer standard testing program.

Compliance report and record of calibration shall be provided in “BIDDER’s” MDB (Manufacturer’s Data Book).

#### 4.12.4 Preferred Suppliers for Instrumentation



- ENDRESS HAUSER
- WIKA

### 4.13. Piping Requirements

4.13.1 Flange dimensions shall be in accordance with the applicable DIN standards. ASME B16.5 flanges shall NOT be used.

4.13.2 “BIDDER” shall indicate the maximum allowable nozzle loads.

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4.13.3 Bolt holes of connecting flanges shall straddle the center-lines of the equipment or the lines parallel to these center-lines.

#### 4.14. Painting Requirements

Painting for items in accordance with manufacturer standards.

#### 4.15. Nameplates and Tagging

Each equipment item shall be provided with a permanently attached Stainless Steel nameplate with engraved lettering including the following:

- purchase order no,
- manufacturer name,
- serial no / model no,
- equipment tag number,
- year of manufacture,
- equipment specific design data.

## 5. QUALITY CONTROL, INSPECTION AND TESTING

### 5.1. Inspection

Quality control plans shall be prepared, based on the actual production facilities of the “BIDDER” or sub-”BIDDER” performing the work to ensure compliance with statutory requirements, requirements in this requisition and delivery of equipment within specified time.

### 5.2. Testing



“BIDDER” shall perform all required tests to ensure compliance of the equipment with this requisition. “BIDDER” shall include the following testing as a minimum:

- 1 Visual & dimensional inspection
- 2 Balancing of the rotors
- 3 Mechanical running test (cold test) – Vibration report required
- 4 Shipping preparation check

## 6. GUARANTEES

All materials, design and construction shall be subject to the conditions and guarantees described in Commercial Part.

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## 7. DOCUMENTATION REQUIREMENTS

“BIDDER” shall prepare and submit together with his quotation documentation as described in item 7.2.2. 1. as well as filled in table 7.2.1. (column 4).

### 7.1. Documentation to be submitted after award

7.1.1 “BIDDER” shall supply all documents specified in table 7.2.1.

7.1.2 The dates in column 4 agreed with “BIDDER” for submission of documents are part of the Purchase Order and shall be submitted on or before the specified dates. These dates shall be mutually agreed between “BIDDER” and “ORDERER”



7.1.3 As-Built Final Documentation (MDB and IOM) in 4 hard-copies and on CD-ROM.

### 7.2. Document Commitment Requirements

#### 7.2.1 Required documents

Column:		1. Number of copies required with quotation.	3. Reference to clarification, explaining contents of documents (see 7.2.2).		
		2. Number of copies required after award for review and/or information.	4. Delivery time of documents in calendar weeks after date of order placement.		
1	2	DESCRIPTION OF DOCUMENTS		3	4
E	-	DC-SHEET, COMPLETED		-	-
E	-	PROPOSAL INFORMATION		1	
E	E	FABRICATION SCHEDULE		2	
	E	DIMENSIONAL OUTLINE DRAWING		3,4	
	E	NAMEPLATE DATA		-	
	E	COMPLETED SPECIFICATION/DATA SHEETS		-	
	E	INSPECTION AND TESTING PLAN		5	
	E	MANUFACTURERS DATA BOOK (INCLUDING CERTIFICATES)		6	
	E+4	INSTALLATION, OPERATION AND MAINTENANCE MANUAL		7	
	E	SHIPPING DATA		8	
Note: “E” refers to the electronic copy					
		<u>With proposal</u>	<u>After order placement</u>		
		Documents indicated as required with quotation/proposal to be mailed as part of bid package. For e-mail address see Commercial Part	Documents to be mailed. For e-mail address see Commercial Part		

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## 7.2.2 Document Clarification

### LANGUAGE

The text on all documents shall be in the English language or in the Polish language, except for the - Installation, Operation and Maintenance Manuals which shall be in the Polish language.

Names of mechanical equipment shall be in the Polish language.

For documents where the English and Polish language is used, the English language is governing.

### 1. PROPOSAL INFORMATION

The quotation/proposal shall include the following:

- Completed specification/data sheets
- Dimensional outline data including major weight data and dynamic forces
- Noise emission data
- Piping interface drawing incl. nozzle loading
- Civil/structural interface data
- Statement of compliance or listed deviations from specifications and their references
- Priced spare parts list as specified including manufacturer's names
- List of special tools
- Guaranteed vibration data
- List of proposed sub-vendors/contractors
- Catalogue data

### 2. FABRICATION SCHEDULE

Bar chart or equivalent schedule including:

- Engineering activities
- Dates for engineering, ordering, manufacturing, testing and inspection of main materials and subordered equipment
- Preparation for shipment and shipment data.

### 3. WEIGHT/FOUNDATION/ANCHOR BOLT DATA

Remark for simple equipment: may be combined with 4.

- Loads of equipment on foundation and structures/building incl. windloads
- Unit weight including: weight of each major equipment, center of gravity and lifting points
- Foundation interface details:
  - footplate dimensions, incl. hole pattern, levelling and grouting data
  - template data for large pieces of equipment
- Anchor bolt data incl. type, materials, dimensions and ring/nut data

### 4. DIMENSIONAL OUTLINE DRAWING

- Scale factor
- Orientation/show arrow <NORTH>
- Location and overall dimensions of equipment and electrical/control system cabinets
- Location and size of foundation bolt holes
- Make, type, rated power and speed of driver(s)
- Make and type of coupling and mechanical seal(s)
- Direction of rotation of shaft(s)
- Unit weight including: weight of each major component, center of gravity and lifting points
- Required space for maintenance and dismantling
- Equipment, piping and components
- List of all pipe connections, including location, size, rating and finish

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A5NU	0001	55	S013	14	16	0



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- Maximum allowable forces and moments on nozzles

#### **5. INSPECTION AND TESTING PLAN**

The following shall be submitted for review and mutual agreement.

Inspection procedures Shall describe at least:

- All tests that will be performed during fabrication and after fabrication
- The witness- and hold points for the inspection authority

Test procedures

A summary of proposed test procedures shall be submitted for review.

#### **6. MANUFACTURERS DATA REPORT**

(including certificates)

The manufacturers Data Report shall contain at least all data required by the authority code and including certificates:

- All documents, data and certificates as required by the local authorities and those as specified
- Material certificates shall be provided for all pressure containing parts and for rotating components
- All required electrical certificates and test reports, motor operation and maintenance manual
- Manufacturer's certificate of compliance that equipment does not contain materials such as asbestos, etc. as prohibited by local regulations
- Limitations with respect to environmental emission, as specified

#### **7. INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

The manual shall at least include the following sections:

##### **A Installation**

- Storage
- Foundation
- Grouting
- Setting equipment, rigging procedures, components and lifting diagram
- Alignment procedures
- Piping/electrical/instrument recommendations
- Dimensional outline drawings
- Dismantling clearances

##### **B Operation**

- Start-up, including tests and checks before start-up
- Routine operational procedures
- Lubrication recommendations

##### **C Maintenance disassembly and assembly**

- Routine procedure to perform proper maintenance
- Illustrated instructions regarding (dis)assembly for maintenance & repair
- Trouble shooting procedure

##### **D Performance data/curves**

- Performance reports and curves as specified

##### **E As-built data**

- As-built completed data sheets
- As-built drawings including clearance

##### **F Drawings, schematics and lists**

- P&ID's
- Flow schematics
- Certified dimensional outline drawing
- Cross-sectional drawing and parts list
- Piping drawing(s) and isometrics
- Lubrication unit component drawings and data

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### G Spare parts recommendations

- Insert data for operational spare parts.

### 8. SHIPPING DATA

List of shipping items including:

- Dimensions of packages that will be shipped
- Weight data
- Lifting data
- Strength calculations for large parts

## 8. LIST OF ATTACHMENTS

The following attachments and the therein referenced documents form an integral part of this requisition.

Att.	Description	pages	revision
1	Data Sheet	4	0
2	Motor Data Sheet (24/1)	3	0
3	Motor Data Sheet (24/2)	3	0

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A5NU	0001	55	S013	16	16	0